AUDIO SPECTRUM ANALYSIS OF NATURAL ALTERNATING FIELDS IN THE ATMOSPHERE AND SOME UNANTICIPATED RESULTS

A DISSERTATION

PRESENTED TO THE FACULTY OF THE

VASILE GOLDIS WESTERN UNIVERSITY

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF SCIENCE IN PHYSICS ENGINEERING

By

Florian Meinhard König

April 2004

Vasile Goldis Western University

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Date. 14.04.2004

for conferring the title of

"DOCTOR OF SCIENCE IN PHYSICS ENGINEERING"

to

Mr. FLORIAN M. KOENIG

The Board of Vasile Goldis Western University, Wilmington, Delaware, convoked in extraordinary meeting on the 14th April 2004, considering:

- the decision of the Executive Board of the Vasile Goldis Western University, concerning the foundation, according to the university rules, of the honorific distinction "DOCTOR OF SCIENCE";
- the recommendation of the Academic Council of the Faculties;
- their prestigious didactical and research activity;
- the Law of Scholarship, which grants the superior schooling institutes the right to issue and award university honorific distinctions;

According to the University's Articles the Board of the University has

DECIDED:

Art. 1.: The didactical honorific distinction of "DOCTOR OF SCIENCE IN PHYSICS ENGINEERING" upon Mr. FLORIAN M. KOENIG's dissertation "AUDIO SPECTRUM ANALYSIS OF NATURAL ALTERNATING FIELDS IN THE ATMOSPHERE."

Art. 2.: We are honored to confer upon Mr. FLORIAN M. KOENIG the award of Doctor of Science with all the rights, privileges and honors thereto pertaining.

For The University

Dean of the University
Wilmington, Delaware

VASILE GOLDIS SEAL WESTERN UNIVERSITY

Vasile Goldis Western University

The Trustees of the University have conferred upon

Florian M. Koenig

in recognition of the fulfillment of the requirements, the degree of

Doctor of Science

in Physics Engineering

With all the rights, privileges and honors thereto pertaining.

In Witness whereof the Seal of the University and the signatures of its officers are hereunto affixed.

Given at Wilmington, Delaware, this fourteenth day of April, in the year two thousand and four.

Rector of the University

VASILE GOLDIS WESTERN UNIVERSITY VGU

Dean of the University

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by

Florian Meinhard König

ABSTRACT

AUDIO SPECTRUM ANALYSIS OF NATURAL ALTERNATING FIELDS IN THE ATMOSPHERE AND SOME UNANTICIPATED RESULTS

Florian Meinhard König, D.Sc.

VASILE GOLDIS WESTERN UNIVERSITY 2004

Weather processes correlate with electromagnetic alternating ELF/VLF fields. Specifically, this refers to horizontal and vertical air movements noticed as discharges. Numerous biophysical and electrophysical processes are directly influenced by such so-called atmospherics or sferics (AIS).

Herewith were studied the sferics at various locations around the world, using portable recording equipment. Spectrum analysis was performed later, with a three-dimensional display mode. It was desired to extract and model recordings matching weather conditions known to be healthful and pleasant. During individual recordings of AIS, nearby persons were interviewed daily. Later, a pilot **blind** study was performed, involving 29 persons. They were exposed to sferics and technics alternating fields, and freely expressed how they felt at the moment. The result demonstrates clearly that nice weather (high-pressure areas) evokes the most positive statements. Nice weather was described as "pleasant". The significance of the result was very high, namely 96%. On the other hand, negative comments were made about weather situations ranging from foehn and the sudden onset of cold air to mixed fields with technics.

Further, a biomedical PROGNOS™ test developed for space exploration was successfully administered to four test persons. It underscored the obtained results.

ABSTRACT

It should be emphasized also that a high degree of statistical significance was obtained between sferics/weather and technics (OMEGA signals) situations on the one hand and related signal structures and frequencies on the other. Specifically, these correlations are as follows:

- Omega signals or sferics or AIS at a frequency of 12 kHz or 12.5 kHz correlate with stimulating, animating, irritated, aggressive weather, such as foehn as well as with an imminent or existing sudden weather deterioration caused by the influx of cold air, etc.;
- Omega signals or sferics or AIS at a frequency of 15 kHz correlate with an existing, dominant or nearby low-pressure system as well as with a feeling best described as tired, relaxed/calm, worn out, depressive; and
- broadband, atmospheric pulse curves (from approx. 1 kHz to greater than 18 kHz, relative to the main intensity) correlate with a relaxing-pleasant, calmingly-neutral high-pressure weather situation or meteorologically more uniform weather phenomena.

In addition an unexpected model was obtained, in the form of a mathematical function, which makes it possible to locate the epicenter of an earthquake **before** it occurs. This was done by recognizing ULF abnormalities (sferics signals which periodically dropped out) in 3-D spectrograms, from which the related distance could be derived. A conspicuous example occurred before the major earthquake in Afghanistan on 3/25/2002.

The essential **task of this work,** namely to acquire so-called "nice-weather sferics", **has been accomplished** and is available de facto as a series of analyzed audio sound recordings. These sferics were found in long-term high-pressure weather systems which have just been formed or which are in the process of being formed.

At present, major issues concerning how to administer sferics are open. It is recommended that these issues be resolved in additional studies.

BIOGRAPHICAL SKETCH

This work resulted from years of professional work in the fields of acoustics and telecommunications and parallel with alternatingly influencing, atmospheric earth climates.

Free, unconventional thinking was required for this work; I wish to thank my parents for teaching me this. My mother, Christl Erika Susi, is a musician who remained unrecognized in the chaos of WWII.

My father, Herbert Leonhard König, studied the Schumann resonances as a university professor. He passed away in 1996; I wish to view this work as a scientific continuation of his own technical thinking.

On the other hand, there were many hindrances in my life which had a lasting effect. As an example, I had a serious accident on 4/18/1971, which gave me the opportunity to have a so-called out-of-body experience.

DEDICATION

Dedicated to my children

Anja *and* Svenja

in moments when I cannot

be with them

ACKNOWLEDGEMENTS

With sympathy, I think about the support provided by my brother, Christian, who was involved in laying the foundation of my professional life.

Further, I am thankful to my wife Dagmar for the experience of being her husband and the father of our two children, Anja and Svenja. Other relationships with those whom I know have opened my eyes. In particular, I wish to thank Anita Gerisch; "all kinds of things are possible with a calm soul".

At this point, I wish to mention estimable professionals, including Werner Hengstenberg, Dipl.-Ing. Hans Baumer, Dipl.-Met. Walter Sönning, Prof. Dr.-Ing. Siegfried Steinberger and Dr. Reinhold Martin (patent attorney in Munich), who have given me support with fruitful discussions, advice and assistance.

This would not have been possible had I not found a triumvirate with my collegial associates Manfred Hartmann (deceased) and (Jens-) Michael Willberg.

Finally, I wish to thank Mr. David Burkhart (Munich, www.us-english.de) within the framework of the translation work. He expressed the intent of this "work" in words for speakers of the English language.

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PREFACE

In our highly technical time, we are surrounded by electrical processes which use computer-supported technology. These processes influence the lives of people and nature.

Perhaps it is significant whether this takes place in transportable devices or anchored in the ground or in the air – especially since only in the past one-hundred years have we been able to adapt to this biologically-genetically.

We are familiar with how fast such adaptations can occur during the evolution of life on our planet Earth. However, this does not apply with regard to synthetic influences, such as electromagnetic waves generated by humans.

On the other hand, the question arises: Starting at what point can something considered to be synthetic, when something was created by inhabitants of our planet? Hence, one-hundred years for a certain development would initially seem to be too short. Thus, the next question is what has happened with us humans during this time; and to what extent has the technical revolution meant more than luxury, comfortable living, a longer life with superior medical care.

Long-term studies **[1, 2]** verify that human mortality has increased in the second half of the twentieth century, with regard to certain kinds of cancer.

This is not the place to analyze the details of this issue. Unclear, complex factors probably play a role; they presumably apply on a case-by-case basis and cannot be generalized. Further, the structure of natural fields is usually different than human accomplishments or even more complicated.

Ultimately, we always have the option of imitating natural phenomena or copying something for "beneficial" purposes.
Perhaps this work can throw some light on the meaning of these statements.

A general note on this work: In the following text, all figures and illustrations were numbered chronologically for each chapter. That makes it easier to compare technical illustrations in context; however, this deviates from the contentual sequence.

LIST OF FIGURES

Audio spectrum analysis of natural alternating fields in the atmosphere and some unanticipated results

Chapter 1
Introduction

Humankind has always dealt with nature and its surprising properties. The processes of nature were often understood in a mystical sense. It has proven possible to create models of many effects which in earlier times were interpreted supernaturally and hence to describe or reconstruct them. Nature often provides superior solutions, and people use this as orientation. This insight plays a significant role in the results documented in this work. For several months, investigations were made of the weather, meteorological phenomena, their

properties and effects on people, and of helpful information concealed in these phenomena.

Since prehistoric times, people have presumed and scientists have shown that "weather" involves more than merely air pressure, humidity and temperature. A dramatic demonstration of this is the spectacle of lightning. During thunderstorms, they reveal an entirely different picture of the atmosphere, namely varying atmospheric electricity.

The atmosphere is not merely static. Rather, it is affected by dynamic processes, known internationally as atmospherics or sferics or AIS (atmospheric discharge radiation). For more than thirty years, scientists and others have dealt with the sferics, as they have more influence than people would like (the issue of printing techniques will be discussed below). Sferics can even be heard, by converting the electromagnetic energy to acoustic fields.

Thus, this discussion will deal with **electrophysical processes with equations, magnitudes and units**, which are summarized in the following **overview**:

Frequency

f = oscillations per second [Hz]; Hz = 1/s (s = second)

Main frequency ranges (radio defined)

- **ULF** = ultra low frequency (range: 0,01 Hz - 1 Hz)
- **ELF** = extremely low frequency (range: 1 Hz - 3 kHz <> 1 kHz = 1000 Hz)
- **VLF** = very low frequency (range: 3 kHz - 30 kHz)
- **LF** = low frequency (range: 30 kHz- 300 kHz)
- **MF** = medium frequency (range: 300 kHz - 3 MHz <> 1 MHz = 1000.000 Hz)
- **HF** = high frequency (range: 3 MHz - 30 MHz)
- **VHF/UHF/SHF** = very/ultra/super high frequency (range: 30 MHz - 30 GHz <> 1 GHz = 1,000,000,000 Hz)
- Infra-red light, X-rays, cosmic rays

Electrical field (homogeneous)

E = U/d [V/m]; Volt [V] per meter distance [m]

Magnetic field or magnetic induction

$\phi = B * A$ $B \sim I$

$\llcorner$ proportional

$1 * B\ [1000\ nT] = 1{,}25\ H$ [A/m] $H = I / 2 * \Pi * r$ (Tesla ~ Ampere)

(ϕ = magnetic flux in nano Tesla [nT], A = surface [m^2], $\Pi = 3.14$, r = = radius [m], I = current [A])

A human individual has a web of interconnected nerve tracts in the body. Nerve pulses send information from A to B. This transfer of data can be influenced not only mentally (involuntarily) or voluntarily, but also externally. This justifies the public discussion of the concept of the "limit value" of technical, artificial fields, as they affect living beings.

Additional issues include the following:

- Are some fields beneficial?
- Are any of the natural fields harmful? - a rhetorical question as it is well known regarding radioactivity).

This work will focus on evidently low-frequency fields; it will be shown below that they have pronounced long-wave properties. The properties of such fields are grounded in the spectral components. This will be examined from the point-of-view of measurable electromagnetic field intensities, rather than statistically as per **[3]**. The technical radiation is present in nature, just like the sferics, and can also be compared directly.

This has never been attempted, up to and including the very recent past, for these reasons:

- Sferics were not considered to be weather-based information for forecasts; and
- Portable, digital audio signal recording technology has not been available.

Hence, only in recent years has it become possible to measure sferics for scientific purposes, in settings ranging from immaculate nature to inhabited areas and installation sites of technical equipment.

In this context, concepts such as meteorosensitivity and electro smog should be mentioned; they provide some of the background for decades-old public discussions of nature and technical development.

The knowledge gained can be used to design simulation equipment which artificially reproduce nearly-natural processes, in the form of electromagnetic, burst-like radiation. This is applied, for example, in magnetic field therapy. The objective of this work is to not merely gain knowledge; additionally, it is desired to "copy" the natural real-time radiation in an optimal way, in accordance with the current state of the art.

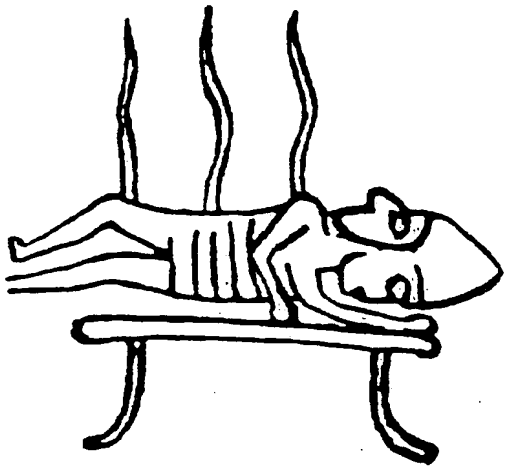


Figure 2.1: Sumerian roll seal portrayal of an explicitly named "Radiation treatment", approx. 6,000 years old (from **[4]**; Figure 103).

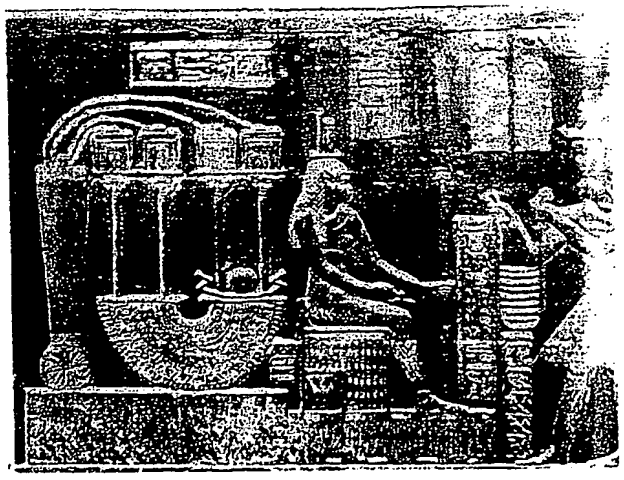


Figure 2.2: Illustration of the electro galvanic process in an Egyptian pyramid, at least 3,500 years old (from **[5]**; Figure 27).

Chapter 2
Electrical, magnetic and electromagnetic D.C. and alternating fields in nature and technology

2.1. Historical background and foundations in biophysics and electrophysics

The initial focus should be placed on the development of humankind and their technical accomplishments, to the extent that the nearly prehistoric documents permit. Ca. 6,000 years ago, images were created based on Sumeric roll seals **[4]**. These images were developed by rolling the seals out over a clay base. This indicates that the people at that time were apparently familiar with how to treat disease with radiation (see **Figure 2.1.1**). This fact was described literally in Sumeric texts. It is no longer possible to determine the exact kind of radiation that was used.

Based on Egyptian wall paintings in the pyramids of Gise', it is known that electrogalvanic devices were apparently in use more than 4,000 years ago ([5]; see **Figure 2.1.2, 2.1.2a, 2.1.2b**). In the 1970s, the images and texts on them (for instance, isolators) were decrypted. The devices were reconstructed successfully. The discovery of the compass several hundred years ago should also be mentioned. Also, the fact that in Medieval times experiments were performed involving magnetism and the effects of the earth's gravitational field (the constant magnetic field of the earth).

Only as the Industrial Age dawned in the eighteenth century did some physicians and medical doctors begin to deal with the phenomenon of electricity **[6]**. As an example, it should be mentioned that the electrical potential differences of highly cooled and foot-amputated frogs were noted **[7]**.

In addition, there followed a large number of electrophysical inventions **[8, 9]**. Due to these devices, towards the end of the nineteenth century utilization of alternating current was recommended (see **Figure 2.1.3**). This was based on knowledge of low- and high-frequency alternating fields; i.e., dynamically changing electrical and magnetic fields having a frequency greater than 0 Hz. It became possible to transport high levels of energy hundreds of kilometers with and without overhead power lines, like today. With DC currents and voltages, this initially seemed to be impossible.

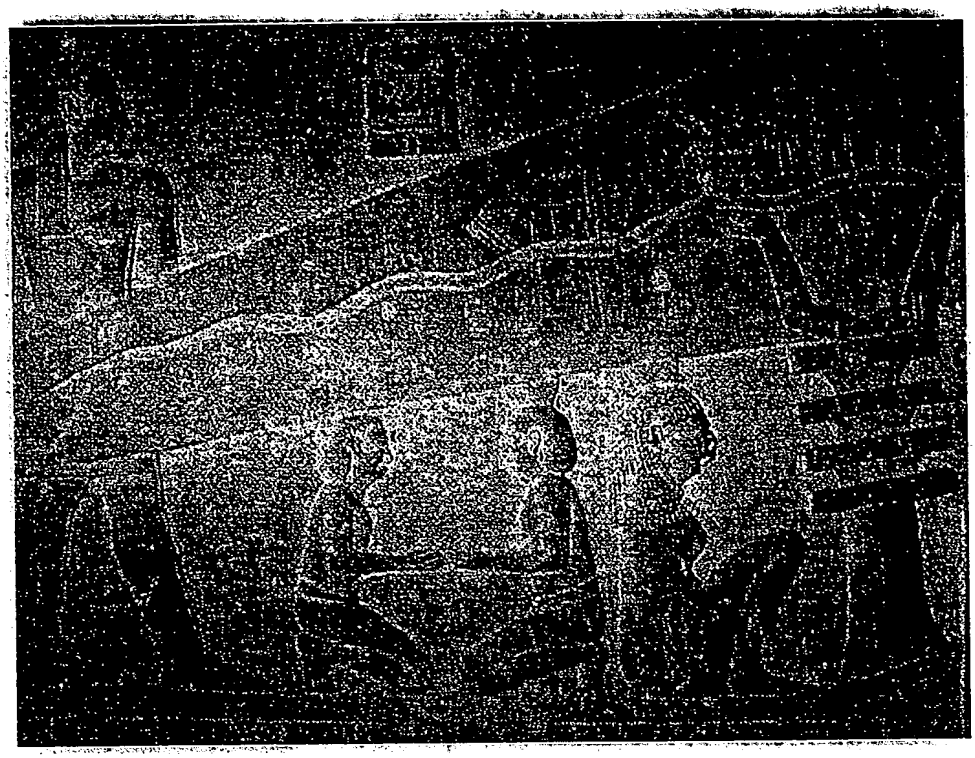


Figure 2.1.2a: Detailed illustration of the electro galvanic process, with a glass tube and a rib-like isolator in an Egyptian pyramid.
At least 4,000 years old (from **[5]**; Figure 28).

Figure 2.1.2b: Functional electro galvanic experiment, reconstructed in the 1970s. Refer to the photographed glass tube and rib-like isolator (from [5]; Figure 32).

Even during the argumentation concerning the future power system, ca. 1900, it was already known that electrical alternating current can be deadly. An example is an alternating current shock from a wall outlet.

In 1905, TESLA began building magnetic field therapy machines. Apparently, he was able to cure colds by treating them with alternating signals. Further, he supposedly performed experiments which formed artificial clouds in his roomy laboratories. For this, apparently frequency-tuned resonant coils and tremendous voltage levels (> 1 Megavolts) were employed. In addition, he conducted high-frequency experiments. The results included a high-frequency lamp whose efficiency was considerably higher than that of common incandescent bulbs. It contributed to the development of X-ray photography. Disputes about patent rights, regarding who the inventor of wireless transmission was, were finally

resolved in his favor in 1945 (see objection **[9]** to the tenet in favor of MARCONI).

Some years later, his experiments had progressed to the point that his experimental apparatus apparently was able to electromagnetically resonate with the earth, at frequencies of 12 to 13 Hz. He supposedly provoked earthquakes and was able to cause tornados to dissipate. There are controversial scientific discussions involving one of the pioneers, because to the present day many of his inventions have not been reconstructed.

Schumann was inspired by this work. During the 1950s, he discovered a singular, especially low-frequency continuous oscillation, now known as the Schumann resonance. This designates a frequency spectrum which encompasses the globe, starting at 7.8 Hz, and includes harmonics (see **Figure 2.1.4**). The fundamental principles of the Schumann resonance have been clarified. It is excited by the permanent lightning around the equator.

These developments made possible broadband, technical utilization of all available electromagnetic frequency ranges, from some millihertz to far beyond the Gigahertz range (see **Figure 2.1.5**). A noteworthy example is radio transmission. In those early days, transmission of audio signals was distorted by crashing noises (e.g. during thunderstorms).

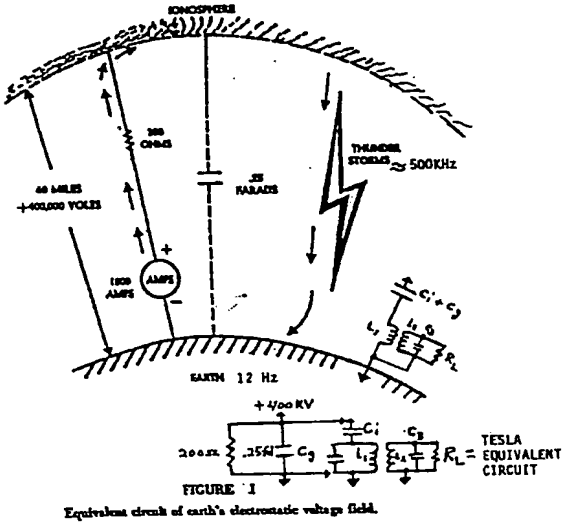


Figure 2.1.3: Original copy of an equivalent circuit showing how the earth's atmosphere functions, according to Nikola Tesla in the 1920s.
From [8]; collection of drawings starting on p. 257.

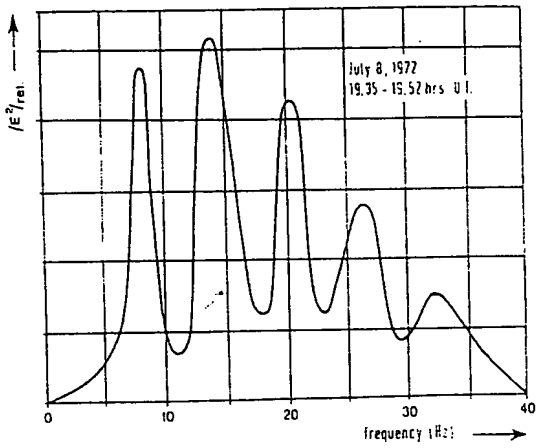


Figure 2.1.4: The spectrum of the vertical propagation of the natural magnetic ELF/VLF field, known as the SCHUMANN resonance.
Stimulated by the lightning of thunderstorms, it propagates as a resonance around the globe, between the ionosphere and the earth's surface (from **[1]**; p. 53, Figure 10).

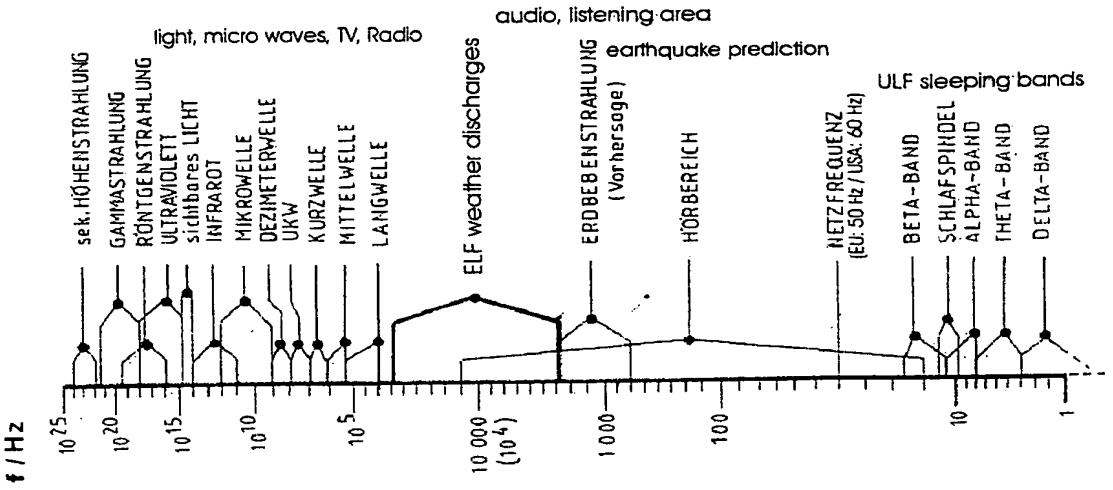


Figure 2.1.5: Graphical overview of all essential frequency ranges.
Electromagnetic sferics radiation is added.
As mentioned in **Chap. 1** (from **[3]**; p. 131).

Not only radio operators discovered that transmission and reception range was better at night and in certain atmospheric conditions.
Incidentally, these atmospheric discharge effects are used even today to localize thunderstorms by means of short- and middle-wave transmission stations.
Lightning bursts heterodyne with local high-frequency signals, which are transmission fields. This is known as "frequency pulling" **[6, 9]**.
Starting around 1950, scientists and researchers began to deal seriously with the effects of such synthetic fields [7]; more will be said about this below.
The history of biophysics and electrophysics would be incomplete without mentioning the "European" development of acupuncture, a technique which has been in use for millennia. It is known that the exchange of information (nervous

impulses) is interrupted at so-called meridians. The latter can be viewed as the "main intersections" of the nerve tracts. This has an anesthetic effect.

In the 1950s, the electrical industry issued numerous recommendations **[10]**. One of these standards, DIN 0875 and also DIN 0848 (50-Hz power grid, Part 4A1), was formulated primarily to protect workers. It describes how the biological effects of magnetic field intensity increase proportionally with frequency. As the frequency increases, German Industrial Standard DIN 0875 recommends reducing the field intensity to avoid hazards to human health (see **Figure 2.1.6**). It remains valid to the present day.

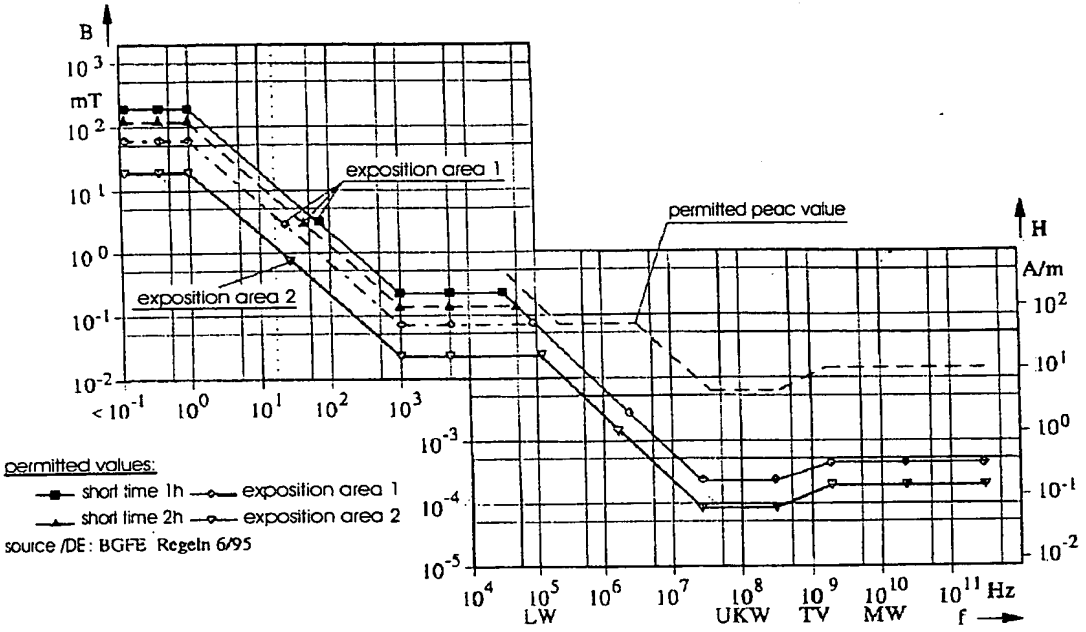


Figure 2.1.6: Permissible maximum or peak values for AF/HF magnetic radiation as well as various field exposure times as a function of frequency, in accordance with the so-called precautionary values (magnetic flux density) based on VDE-DIN 0848, Part 4A1 (from German BGFE, Rules 6/1995 **[10]**).

In 1990, C. F. Müller published an overview, titled "Katalyse" **[11]**, which quoted respected studies and quoted **threshold values of around 100 to 300 nT** for various common diseases, such as juvenile leukemia, mineral deficiency, depression, etc. For some of these investigations, critics found different flaws. However, overall, the limit value recommendation of less than 500 nT was confirmed.

In addition, recommendations and international standards have been applied to computer screens placed directly in front of human heads. Examples are the Swedish standard, TCO '95/MPR II **[12]**; frequency range 5 Hz to 2 kHz) and NCRP. These recommendations and standards establish maximum limit values for electromagnetic fields of PC monitors. For the electrical field, the limits are some 10 V/m; for the "magnetic field" they lie between 100 and 200 nT (nanoTesla; the correct term is magnetic induction).

By way of comparison, a maximum value of 100,000 nT (at 50 Hz) is seen as permissible by the EMC regulations (CE certification) of the German radiation protection commission and the World Health Organization.

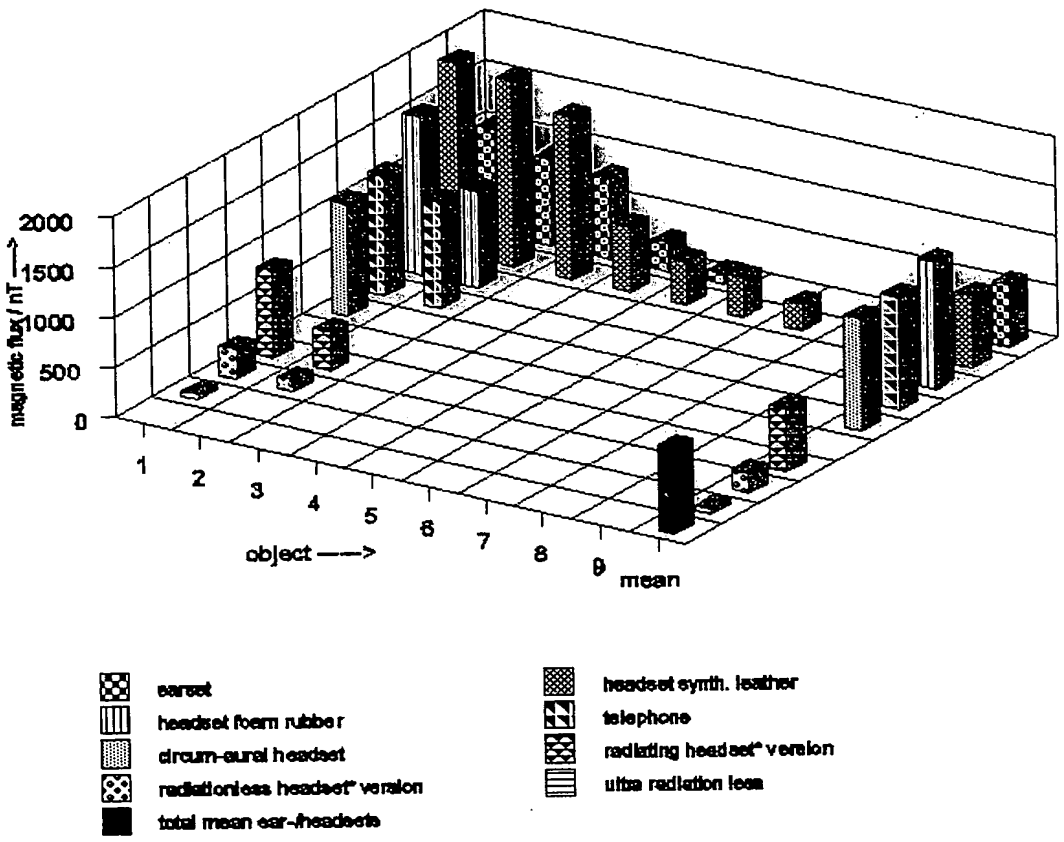


Figure 2.1.7: Graphic of the magnetic flux in nT, when various headsets are worn at the usual position at the ear or temples, for a predefined acoustical transducer deflection with a pink noise signal of 70 dBSPLC.

Further studies **[13]** have investigated the radiation emissions of sound systems placed on the head. The problems caused by, e.g., power transformers in electronic equipment or the stray 16 $^{2}/_{3}$-Hz magnetic fields of subways, commuter trains and

trains cannot be solved realistically by maintaining a certain minimum distance. Since WW II, a heavy metal alloy called MU metal has passed the test of time. It has a very high value of permeability, namely 80,000 (this is the "conductivity" of magnetic flux; the comparable value for air is 1).

Based on this, since 1998 head-held sound systems such as headphones and headsets (which can create acoustic pressures of more than 1,000 nT at 70 dBSPLC [pink noise]) are shielded with specially designed MU metal systems **[14].**

For this reason, low fields of less than 50 nT are common at the headphone's typical point of contact at the temples, instead of 1,000 to 2,000 nT. (Note the audio signal bandwidth of 20 to 20,000 Hz; see **Figure 2.1.7**).

2.2. Historical background and fundamentals of meteorology and sferics radiation

Humans have probably observed the weather since the earliest of times. People probably took instinctive sensations into account, in addition to their visual near field analysis. In this way, humans are quite like other animals, such as insects, birds and other mammals, like cats and dogs with their "meteorosensitivity". General factors influencing the weather situation include:

- day and night,
- the temperature,
- the air pressure,
- the wind strength (wind direction),
- humidity, as well as
- precipitation (rain/snow) or dryness.

The fact that actual atmospheric conditions are characterized by mixtures of weather (with varying degrees of coldness, wetness, heat, humidity, haze, fog as well as cirrus, cumulus and other forms of clouds) will not be discussed here in detail. There is plenty of literature on this subject (see especially **[15]**). The effect of weather influences must be differentiated, as follows:

- biotropy describes the capability of evoking physiological, biochemical reactions in the organism, and

- meteorotropy describes the reactions of biological, biochemical systems to weather influences. This will be discussed below, in terms of the subjective sensations of test persons.

Based on the verification of later analysis results of air electricity, the following text will briefly outline atmospheric conditions in order to provide a context for discussion. Using the date and time information, these atmospheric conditions can be precisely reconstructed as needed. Below, exceptional weather phenomena which influence the health of humans and animals will be specifically mentioned (such as foehn) and are well known. As an example, 2,400 years ago in his work "On the 'holy' disease" HIPPOCRATES (460 - 375 B. C.) made such phenomena responsible for causing epileptic attacks.

A further example of the significance of this work can be found in various past events, described below:

Starting December, 1831, an English captain by the name of ROBERT FITZROY took a surveying ship, the "Beagle", on a trip around the world. With his storm glass, he always knew when bad weather would prevent him from sailing **[3]**. He was accompanied by Mr. CHARLES DARWIN, then still quite young. This storm bell, containing a special chemical solution, is in use to the present day **[3, 16]**. Before and during certain atmospheric conditions, it shows reproducible crystal formations.

Chapter 2.1 dealt with the technology of wireless information transmission, introduced in the 1820. The transmitted signal did not always arrive intact at the receiver; the problem involved more than the limited dynamics and bandwidth of

the passive and active technology (transformers, tube amplifiers, etc.). In addition, the sent signal was distorted in the transmission channel by unintentionally received crashes, bursts or spikes. As was soon discovered, this is due to electromagnetic changes in nature: atmospheric air mass changes at various altitudes (e.g. the west-east drift in the northern hemisphere, turbulence and thermals) and invisible burst discharges.

These so-called atmospherics lead to the concept SFERICS (whereby in the literature "according to BAUMER [3]" is often added). These sferics are low-frequency fields which long-wave properties, as will be explained below. They propagate over hundreds of kilometers, horizontally and vertically. Depending on the main air layers in the atmosphere and the current weather conditions, propagation can be limited to some 10 km (ELF/VLF).

Chapter 3
Overview of the existing research of the effects of electromagnetic D.C. and alternating fields using technical equipment

In recent decades, innumerable investigations have been made of humans and animals by means of applied electricity. As has been already mentioned, significant effects have been achieved. For this reason, at this point it is appropriate to briefly outline some of the better-known work on the effect of electromagnetic fields:

- In the 1950s, BECKER [7] performed experiments on how information is transmitted and how nerve conduction is influenced in animals. Among other things, he discovered that positive and negative direct currents caused nerves to transmit information. In addition, such currents cause injuries to heal; in salamanders, amputated limbs are regrown. However, if the nerve tracts were severed before the amputation, the biological cell repair was altered. For humans, this knowledge is used to stimulate the healing of bones.

This is based on the discovery that pulsing currents in the range of billionths of amperes cause cells and bone marrow to shift. [7] relates this to the semiconductor effect of electrical switching technology.

On the other hand, in the case of cancer cell growth it would seem that too much current is activated. The source of this current is so-called neuroepidermial nerve connections, which function like a semiconductor (see lowest current level for transferring nervous signals). The discovery of these relationships has given medical researchers an understanding of how acupuncture functions at so-called meridians (see main nerve tracts) and why the healing function of the human body can be influenced by mental suggestion.

At very low frequencies (VLF or ULF), a relationship to people's subjective well-being was recognized.

Finally, he also mentioned that living beings on our planet find their bearings by means of a so-called "magnetic organ" in conjunction with the earth's magnet field (see magnesite elements of humans and salamanders, etc.).

- At the beginning of the 1980s, **NEWI [17]** brought together recognized research results on the biological effect of electric, magnetic and electromagnetic fields. The following final statement was made: "Four studies showed no effect, in 46 studies effects were recognized but not verified, another 10 studies showed sufficiently verified effects, and "such effects were confirmed in only 10 studies". The work of **JACOBI [18]** should be mentioned briefly. He wanted to control the platelet growth of irradiated blood by means of "artificial sferics" (10-Hz bursts). The following quotation is significant: "On the other hand, it is noteworthy that significant effects can be demonstrated even for a field strength of merely 0.2 V/m". At that time, the German Research Association expressed concern about field strength levels of up to 0.4 V/m. These statements layed the groundwork for

the TCO limit value definitions for the maximum radiation level of electrical alternating fields for computer terminals **[12].**

- In the 1960s, JOSE M. R. DELGADO **[19]** performed experiments in which injected high-frequency currents affected the reaction patterns of animals. The nerve signals leaving the brain were first "set or programmed" by signal frequencies or electrical behavioral pattern signals. Based on this work, researchers began implanting electronic circuitry, such as RS-32 interfaces in the heads of animals. Such experiments are widely viewed as being unethical.
- In the 1960s, VOLKRODT **[20]** worked as an electrical engineer in a sock factory equipped with special high-performance electrical motors. During his work, he determined that many of the employees who worked permanently around these machines had to leave their workplace due to "nervous complaints", "collapses", etc., caused by the currents of 100 ampere, including harmonics. He was also able to show that conifers function like broadband reception antennas for electromagnetic alternating fields in the Mega- to Gigahertz frequency ranges, due to their needle-like leaves and branch structures. Some of the roots of these trees were excessively acidic; VOLKRODT attributed this to an electrolysis reaction. Anyone can confirm this by observing groups of pine trees placed together within towns or near transmission installations. The treetops of the conifers grouped around the perimeter are more sparse than are those protected in the middle. (This is related to the topics grounding of electromagnetic fields and the principles of forest death.)
- The university research of LUDWIG **[21]**, conducted over a time span of several decades, suggests that these signals lie in a frequency range of magnet field therapy (refer to the "MEDISENT" device) which is apparently out of the range of "treatment-positive" frequencies. The stepped burst frequency settings from 1.4 Hz

to 12.2 Hz have a calming, relaxing, regenerating, etc., effect. However, frequencies of 24.2, 32.4 Hz and higher have a stimulating effect for "fitness", combating fatigue or tiredness.

- On 12/31/2001, starting at 6 p.m. a Berlin radio station called r.s.2 began emitting a minus 35-dB modulation component from a 13.5-kHz and 14.5-kHz signal **[22]**, which was superimposed on the intended audio stereo signal (see **Figure 3.1, 3.2**). This audio sine signal mixture (known as a "happiness drug") was imported as such from the U.S. At the end of the year, it was supposed to put the listeners in a good mood. Other sources also indicate that well-being can be influenced "resonantly" by means of certain electromagnetic or audio-related alternating signals **[6]**. In this regard, quite recently further experimental apparatuses have been developed for medical applications **[23]**.

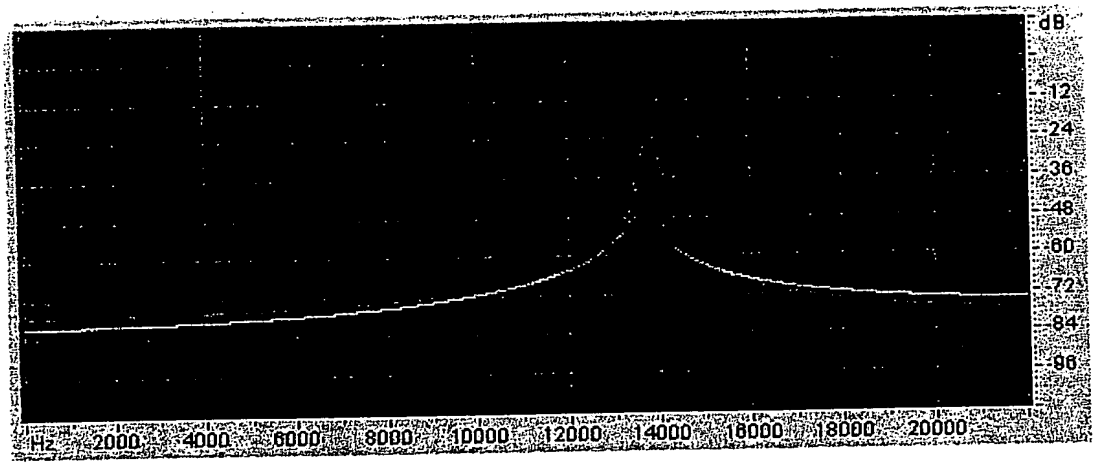


Figure 3.1: Spectrum analysis of tone signal information which was FM-modulated, attenuated and embedded in a stereo radio tone signal.
It has signal components at 13.5 and 14.5 kHz. This is informally referred to as a "happiness frequency drug" (from [**22**]).

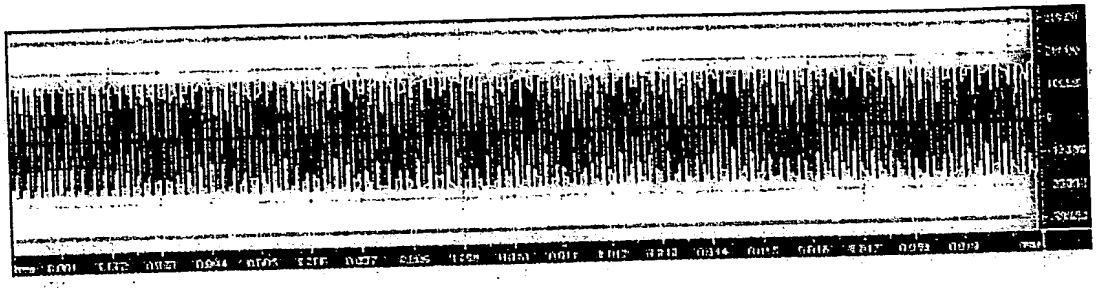


Figure 3.2: Time waveform/oscillogram of the tone signal information analyzed in Figure 3.1, known as a "happiness frequency drug", with components at 13.5 and 14.5 kHz (from **[22]**).

- Towards the end of the 1990s, CARLO **[24]** performed a Wireless Technology Research (WTR) study for operators of cellular telephones. It was desired to show that mobile radio (GSM works with 217-Hz low-frequency pulsed voice signal transmission packets, among others) is harmless for the end user. It was determined that frequent users of cellular telephones, with considerable exposure, had more brain tumors (for details, refer to **[25]**).
- Around twenty years ago, VON KLITZING **[26]** performed experiments with test persons exposed to low-intensity high-frequency fields in electromagnetically shielded rooms. In particular radar technicians, who apparently had been exposed to excessive amounts of radiation on the job, were no longer able to do their usual work because of neuropathy. Because of their pathology, they could not participate in these high-frequency field tests.

At this point, the following issue will remain unanswered. Are these circumstances dealing with natural/artificial fields and their relationship with living beings related to KLITZING's statements concerning the "periodizing effect" of mobile radio (with cell passage frequencies of less than 400 Hz)? Or are these circumstances related to the theoretical contents being discussed here?

- ANDRAS VARGA [27] conducted high-frequency field experiments on chicken eggs. As a result, a number of chicks were born with (genetic) deformations. He states that the phenomenon of exposing living beings to high-frequency evident fields causes drastic abnormalities, such as calves with six grown feet. These deformations could be due to defects in the genetic material (see illustrations).

These are merely some examples of the research concerning electromagnetic fields (mostly technics). All of this research points to the following conclusion: The field radiation intensity of certain low- and high-frequency (periodical) signals chosen for utilizing human information transfer cannot be categorically considered to be harmless.

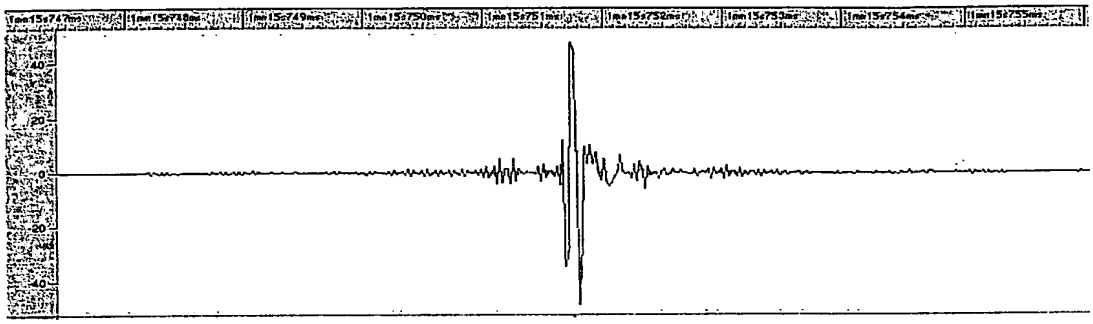


Figure 4.1.1: Time waveform/oscillogram of an invisible atmospheric discharge which presumably took place at a distance of more than 1,000 km.
Due to the weather, the discharge was attenuated in the atmosphere. By the time it reached the measurement receiver, it was converted to a brief 8-kHz Gaussian pulse. This recording was made in the afternoon of 6/20/2002, two hours before a thunderstorm (i.e., a meteorologically instable situation).

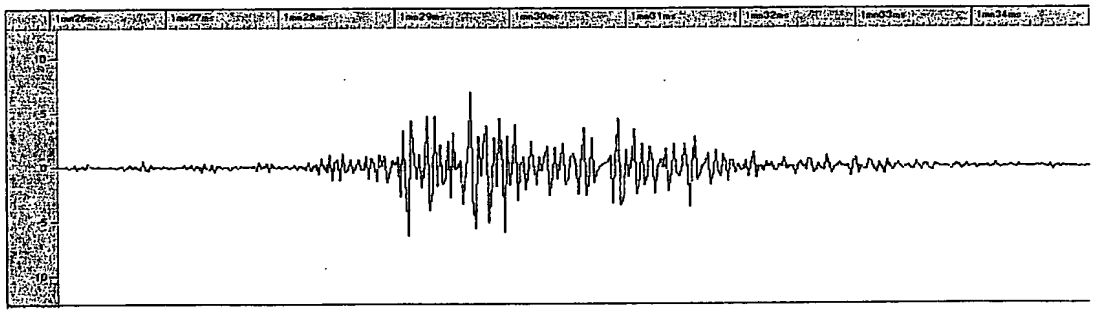


Figure 4.1.2: Time waveform/oscillogram of an invisible atmospheric discharge which took place at a distance of more than 5,000 km.
Due to the weather, the discharge was attenuated in the atmosphere. By the time it reached the measurement receiver, it was converted to a prolonged 15-kHz Gaussian pulse. This recording was made in the afternoon of 6/20/2002, two hours before a thunderstorm (i.e., a meteorologically instable situation).

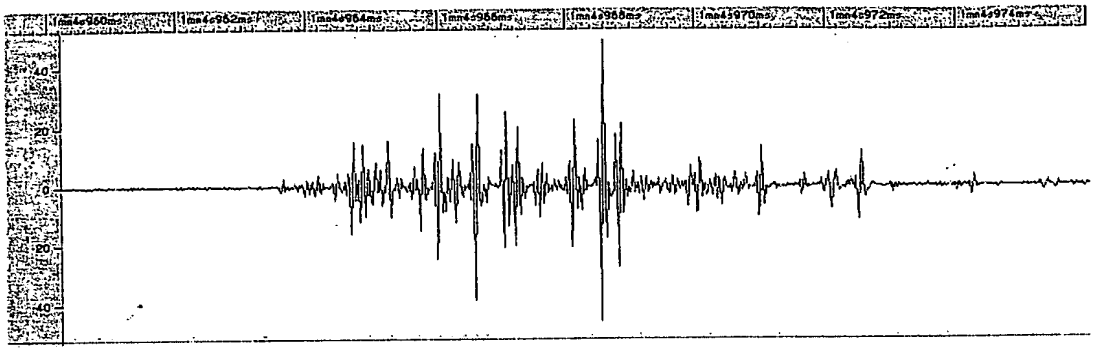


Figure 4.1.3: Time waveform/large oscillogram of several invisible discharges which took place at a distance of more than 1,000 km.
Due to the weather, the discharges were attenuated in the atmosphere. By the time they reached the measurement receiver, they were converted to various Gaussian pulses mostly at 10 kHz (with some also at 8 kHz). This recording was made in the afternoon of 6/20/2002, two hours before a thunderstorm (i.e., a meteorologically instable situation).

Chapter 4
Research and analysis of electromagnetic weather radiation based on the work of Baumer and Sönning: the sferics

4.1. The discovery of the relevance of sferics: an historical overview

Soon after **"atmospheric discharge radiation"** (**AIS** or sferics radiation **[3, 28]**) was discovered around 100 years ago, these natural, electromagnetic fields were soon thought to be a major cause of weather biotropy. During industrial research in Munich, back in 1980 researchers were able to demonstrate the influence of the statistical occurrence of AIS on the diffusion properties of thin gelatine films, used e.g. in copperplate printing to reproduce color pictures. They were able to explain the effect as a biophysical process.

This AIS exhibits various biotropical effects. It occurs in the form of single bursts (see **Figure 4.1.1, 4.1.2, 4.1.3),** known as CD sferics (also called "Convective **D**ischarge **Sferics** according to Baumer"). These bursts are characterized by few, quickly decaying oscillations in a frequency range of around 2 to 60 kHz. They are emitted by dark field discharges (invisible bolts of lightning) in the atmosphere and are found primarily in certain invariable frequency ranges, causing a burst frequency spectrum. The characteristics of this spectrum depend on the weather in various ways (see **Figure 4.1.4**).

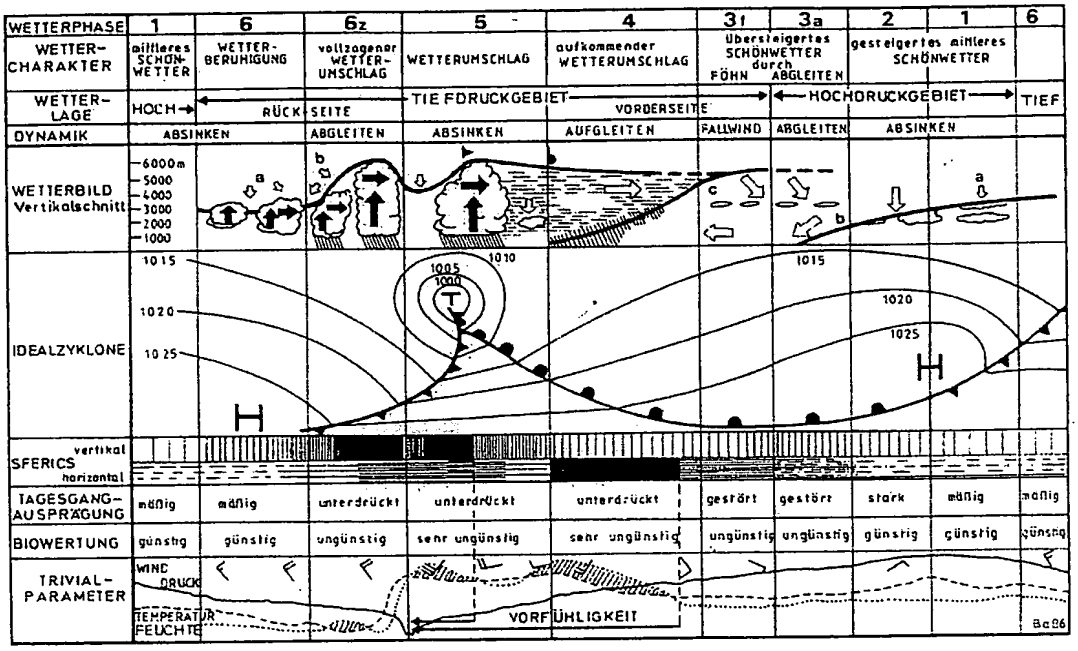


Figure 4.1.4: Overview of various ways of portraying weather phenomena, supplemented by the horizontal and vertical sferics activities as well as related, medical-meteorological evaluations (from **[3]**; p. 252).

Thus, in the 1980s and 1990s, a major, initial contribution was made in the research of the causes of the meteorotropy of biological systems. Research performed by medical work groups at the Max Planck Institute for Biochemistry in Munich, Germany, and at the University of Giessen (Germany) contributed to this work. It was based on the natural, electromagnetic discharge radiation of the atmosphere (VLF), including its ELF discharge repetition frequencies. The probability of occurrence of this discharge radiation follows stochastic laws (the point in time is not periodical).

Simultaneously, the special biotropical weather factor was found which medical meteorologists had long searched for. It was possible to establish a causal

relationship between the meteorotropical reactions (the multifaceted, weather-dependent medical syndromes of the organism; see above) and the biotropical effects of this AIS ("natural electro-mag").

An essential insight was that the meteorotropical syndromes of humans, animals, plants and in biochemical systems are caused by certain natural, electromagnetic fields in the atmospheric environment, via nonthermal effects. The latter influence or disturb, e.g. the neurovegetative regulation of the organism by means of information transfer.

The organism makes evolutionary adaptations to these natural electromagnetic fields. However, this fact cannot be used to derive a generally valid argument that human-made synthetic-technical fields are harmless to health. (This topic will be discussed in detail below.)

4.2. Sferics as a biochemical weather factor in printing technology

As mentioned in the previous chapter, the above-mentioned fundamental knowledge influenced how the graphical industry works, when four-color rotary printing was introduced. At that time, serious disturbances (misprints) were common in copper depth etching, these misprints occasionally lead to intolerable economic losses.

Research was performed in a printing shop, in collaboration with the Technical University of Munich. It was shown that these disturbances were caused by weather-dependent occurrences of AIS in invariable frequency bands at 4, 6, 8, 10,

12, 28 and approx. 50 kHz (with bandwidths of around ±500 Hz). With biochemical and molecularbiological working hypotheses, it was possible to identify permeability changes in the highly standardized dichromate gelatines as the source of the misprints [**28**]. For copper etching, these gelatines (protein-containing material) were used as biochemical membranes. This meteorotropy of the gelatines resulted in an abnormal diffusion time for the etchant iron-3 chloride. In a dipping bath, it had to diffuse through the thin gelatine films lying on the pressure cylinders. In the copper surface of these cylinders, it causes depth etching which can be controlled precisely.

The diffusion times changed spontaneously, depending on current weather conditions. The biophysical reason for these changes related/relates to temporary changes of the pore widths of the membranes. These pore width changes can only be caused when the protein molecules of the dichromate gelatines resonate with resonant-capable AIS single bursts at the right frequency and repetition frequency. Long-term studies demonstrated that, e.g., frequencies around 4.8 and 10 kHz narrow the pores, while frequencies around 28 kHz expand them. By identifying the AIS as the decisive, nontrivial biotropical weather factor, researchers proved the biochemical significance of the AIS.

For a better understanding: This natural, electromagnetic ELF/VLF radiation from the atmospheric environment takes the form of single bursts, the sferics or atmospherics. However, their wave shapes are only similar to attenuated oscillations with few, rapidly decaying amplitudes. They arise from invisible equalizing discharges between electrically positive and negative "space-charge clouds" in the weather layer of the atmosphere. They should not be confused with the signals of visible lightning.

By Fourier analysis, some of these bursts can be assigned to frequencies. In some sections of the above-mentioned frequency range, between around 2 and 60 kHz, some frequencies occur very often, producing a kind of "spectrum of bands". The number of bursts per second (= burst rate, to above 100 Hz) depends on the intensity of the weather situation, a function of the weather thermodynamics and flow dynamics. The burst rate is considered to be a measure of the radiation intensity.

As a result, the often considerable **spoilage rates for color printing** of up to 30% could be lowered to less than **3%** on a long-term basis by correcting the diffusion times for the etchant in the dipping bath in accordance with the currently measured sferics radiation. In particular, the pulse repetition frequencies (around 0.1 to 100 Hz) in the individual frequency bands have proven to be essential for the meteorotropy of the dichromate gelatines. The frequency bands also vary, producing weather-dependent patterns.

As a matter of principle, such diffusion processes also take place on an organic-biological plane, e.g. when substances are exchanged through cell walls or signals are transferred at nerve endings (synapses). Hence, it is assumed that the biotropy of the AIS effects not only technical, highly standardized biochemical function units of an industrial process, but also all biological function systems of a living organism.

This was verified and further developed by the Max Planck Institute for Biochemistry in Martinsried near Munich (Germany), in numerous studies of medical-clinical and biological collectives.

Recently, a work group of the Justus Liebig University in Giessen (Germany) was able to demonstrate that the alpha and beta activity of the brains in the EEG of test persons can be influenced by irradiating them with simulated 10-kHz sferics

shapes with pulse repetition frequencies between 7 and 20 Hz **[29]**. (These shapes simulate the natural AIS.)

4.3. The sferics as indicative weather signals

When one examines the notion that "Sferics or AIS causes problems in technical processes", then the cause can be found in atmospheric conditions or the related air movements.

It was desired to examine these processes in detail. For an entire year, a series of high-resolution, comparative recordings of AIS were made permanently in the frequency bands named above **[3, 28]**. These recordings included notes on the current weather conditions, based on medical-meteorological criteria.

This work produced significant, noncoincidental, very frequency-specific relationships with characteristic movements of atmospheric dynamics, which we experience as the **daily weather**.

In particular, it was shown that there is a relationship between the statistical occurrence of the sferics burst rates or sferics frequencies or their combinations and the current weather processes:

- 10 kHz and horizontal air currents under mostly stabile layers,
- 28 kHz and vertical turbulence extending to high altitudes, with instable cloud layers,
- 8 + 10 kHz and influx of relatively warm air,
- 10 + 12 kHz and influx of relatively cold air. Sferics signals from visible lightning have no biochemical effects, due to their nonresonant shapes. These

signals were filtered out at the receiver, since they can only be used to count the bolts of lightning (see **Fig 4.1.4** und **4.3.1**).

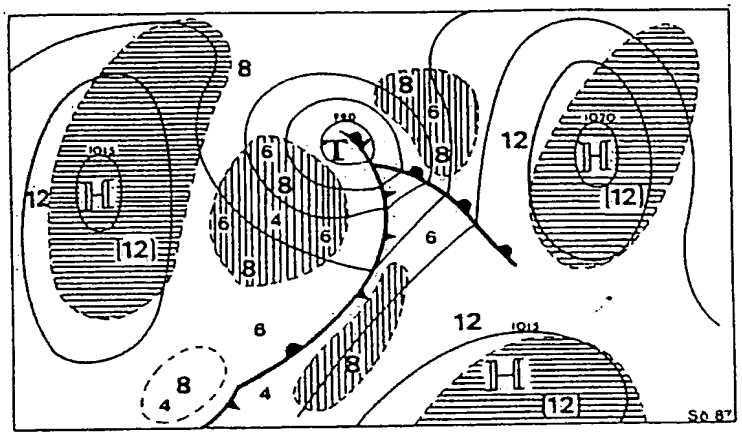


Figure 4.3.1: Juxtaposition of sferics activities, added to a usual weather map, showing them as a function of the related, statistically most common pulse frequency ranges (from [31]; p. 76).

These results made it possible to easily establish relationships between nearly the entire material on the influence of the weather on human and animal organisms and the occurrence of these weather frequencies. Medical meteorologists assembled this material in the phenomenology of the weather biotropy mentioned above.

Thus, the historical, medical-meteorological notion of a nontrivial, biotropical weather factor was shown to be correct. In addition, the demonstration of the biochemical/biological effects of special AIS components was directly confirmed against the backdrop of medical meteorology as a whole.

In sum, the findings on the biotropical effects of the AIS form a nearly complete chain of evidence stating,

- That certain frequency patterns of the AIS can have a biotropical effect on biochemical/biological function systems of all magnitudes, via resonance behaviors in molecular protein structures (such as the above-mentioned gelatines

used for four-color printing). Hence, it is possible to influence an organism's vegetative regulation without a significant transfer of energy (i.e. athermically), with the corresponding health consequences. The latter can be long-lasting.

- That these certain frequency patterns of the AIS have a strictly noncoincidental relationship with characteristic movements of the atmospheric thermo- and hydrodynamics. We experience these movements simply as our daily weather, including the accompanying meteorosensitivity syndromes,
- That the causal interrelationships in the meteorotropy of medical syndromes presumably can only be clarified in full detail by intensive interdisciplinary research. This collaboration must range from the areas of biophysics, molecular biology, biochemistry and electrobiology to the fields of atmospheric environmental research (such as atmospheric dynamics, air electricity, magneto-hydrodynamics, turbulence and chaos theory, etc.). The possible health hazards of mobile radio are also relevant in this context.

All observations to date indicate that the natural AIS and technically generated, so-called electro-mag (caused e.g. by GSM mobile radio) affect the organism, its meteorosensitivity and its electrosensitivity in an equivalent biotropical manner. These effects are noticeable in the form of unspecific, very individual symptoms.

4.4. Medical-meteorological overview of the influence of sferics activities on humans

Much work in recent decades describes the influence of the weather on living organisms (see Chap 4.1., **[28]**). The following descriptions will outline the facts which have been gathered:

In polls, many more than half the people interviewed regularly characterize themselves as sensitive to the weather, often in many individual ways. Medical meteorologists (who study how the weather influences healthy and sick human and animal organisms) differentiate the following three levels of the effects of these noneveryday (better: nontrivial) weather influences:

(1) The weather reaction which any organism unconsciously makes, but which can be proven in temporary changes in physiological or physical-chemical values (such as reaction time, variations of blood pressure or blood values, etc.).

(2) General meteorosensitivity in the real sense of the word, expressed as clear perceptions of the affected persons. For instance, this includes temporary complaints caused by the weather (see **Figure 4.1.4)**, such as:

- Migraine headaches,
- Headaches or scar aches,
- Tiredness,
- Depressive moods,
- Sleep disturbances,
- Slow reaction times (with consequences for accident statistics) and
- Susceptibility to infections.

(3) Meteorotropism, which affects around 1 to 5% of those persons who are sensitive to the weather. They are afflicted with physical or psychic illnesses and pains to the point that they are unable to do their regular work. Under certain meteorological conditions, the ultimate extreme of meteorotropism is an enhanced risk for acute clinical emergencies. They can be life-threatening, such as heart attacks, strokes or thromboembolisms. (These topics will be discussed in the following chapter.)

Meteorotropy designates reactions to short-term, irregular weather influences which affect the health of an individual by strengthening or weakening, e.g. the body's defenses.

Hence, there is no independent "weather illness", caused solely by the atmospheric environment. The periodical or long-term changes in weather elements caused by the rhythm of day and night, weather conditions, the season and the climate (examples are the air temperature, solar radiation or the humidity) do not play a role in how the weather affects an organism.

During the twentieth century, comparative studies (especially in the German-speaking countries) have resulted in large amounts of statistically substantiated material. It can prove there are very many and multifaceted positive relationships between many meteorotropical reactions and characteristic weather phenomena, classified in accordance with meteorological criteria.

This biotropy of the weather, i.e. its special ability to affect organisms in a very differentiated biological manner, was the main topic of medical meteorology for a long time.

Significant meteorotropical reactions were shown repeatedly in several thousand studies involving both humans and animals. Numerous field experiments were made, employing the double-blind technique.

On the front side of low-pressure areas, with an influx of stabile, subtropical warm air, in particular inflammatory processes and hypotone reactions of the circulation are observed.

In the area of instable layers of cold air on the rear side of low-pressure areas, spastic-hypertone reactions (e.g. stone colics or angina pectoris attacks) increase significantly. Country-wide statistics on the daily death rate point most clearly to the dual nature of the weather's influence. These figures show that the death rate increases up to 15% when weather conditions are biotropically very stressful.

At this point, it should be pointed out that this weather-caused additional biotropical stress factor cannot be a major cause of death. However, it can be the final link in a chain leading to, e.g., acute circulatory failure if an organic or regulatory weakness is already present.

As a practical example, it should be mentioned that the public media in Germany have been presenting daily "bio-weather reports" for around the last 15 years.

On a long-term basis, due to evolution the weather biotropy formed by our atmospheric environment thus cannot produce health traumas so serious that (in the wide bandwidth of individual health variances) purely weather-caused permanent damage could be expected.Otherwise, mankind probably would not have survived the past two million years.

4.5. Results of major medical-meteorological studies

The following is a brief summary of major, academic studies of sferics and how they affect humans:

- MORITZ **[30]** reports there is a highly significant relationship between natural discharge radiation and cerebral attacks affecting children and teenagers. 7,026 attacks of child and teenage epilepsy patients in two Munich clinics were recorded statistically. A temporal relationship was established between these attacks and the natural occurrence of sferics activities and atmospheric sferics radiation.

  The results of the statistical correlation indicate the mean frequency of attacks increases significantly on days when a weather-caused rise in the 28-kHz radiation/burst rate was recorded.

  The related atmospheric conditions were designated as, e.g. cyclonal (low pressure) or (in particular) northern Alp foehn.

  On the other hand, epileptic attacks were at a minimum during clusters of 10-kHz activity.

  Interestingly, the effects cancel when both sferics frequencies/radiation are present. Further, when the sferics burst rate for the frequency of around 8-kHz was reduced, the rate of epileptic attacks rose again.

  Based on these results, consideration was given to the idea of constructing a weather early-warning system against the backdrop of recordings of sferics activity.

- In collaboration with various Munich hospitals and their ear, nose and throat wards, SANDHAGEN **[31]** studied the meteorotropy of acute hearing loss, based on the weather-related, atmospheric discharge radiation.

On the basis of 203 cases of acute hearing loss, it was determined that acute hearing loss occurs very significantly more often when night-time 12-kHz sferics activity rises and the 8-kHz activity rate decreases the following night.
The corresponds to a weather situation with several days of influx of cold air at high altitudes (continuously, without an influx of warm air).

- ZNOROWSKI **[32]** discussed statistically significant and highly significant relationships between human sleep behavior and the influence of given, atmospheric discharge radiation.

A number of different, repeating sleep patterns were found. They occurred either with one of the above-mentioned sferics activity frequencies 10 and 28 kHz or with a mixture of them. Among other things, when 28-kHz sferics activities were recorded a tendency to sleep was noted. A correlation between the 10-kHz and 8-kHz sferics and the waking-up phases was also determined.
No clear correlation could be determined between the sferics frequency ranges discussed here and sleep behavior. The sensitivity and reaction patterns were individual. I.e., for a given atmospheric discharge radiation (repeated each time) some of the eleven test persons reacted with, for instance, deeper sleep patterns than did others, and vice versa.

- In a summarizing overall study, test persons were exposed to weak artificial sferics in the nT range. These bursts (with a length of around 500 µs) contained information from weather upheavals. Various substudies demonstrated how the biotropical information in the artificial sferics affects humans **[33]**.

The known findings show an increase of the so-called "Alpha power", changing

the spontaneous EEG. In particular, this result reflects the reaction of test persons who characterize themselves as meteorosensitive. Beyond the time period of the sferics exposure, their electrocortical activity remained changed, compared with the control condition.

Other studies also showed that a 10-minute application of artificial sferics did not influence the simple reaction times of test persons. In an experiment that specifically investigated mood changes caused by sferics, no effects of any kind were demonstrated.

Chapter 5
Intention to reinvestigate sferics activities

As already described, many people considered to be electrosensitive or meteorosensitive cannot or do not wish to directly prove their sensitivity **[34]**. On the other hand, under artificial, protected experimental conditions with varying high-frequency signal irradiation reproducible human reactions can be generated **[26]**.

However, this experimental situation seems to depend on the individual. This is similar to how people vary in their susceptibility for specific diseases.

However, based on twenty years of experience, H. L. König stated in a published expertise **[35]** that increased technics fields – combined with bad weather, such as foehn – can often cause good feelings to change to bad feelings, such as aggression. These fields can also cause a statistically significant increase in many known health disturbances or even illnesses **[25, 35]**. Further, these conditions are more frequent in areas with dense population and are rare in immaculate nature, or occurred statistically less frequently.

The phenomenon of meteorosensitivity should be mentioned. It has been shown that meteorosensitivity occurs not merely in connection with certain humidity, air pressure or temperature conditions (cf. previous chapter, **[30, 31, 32]**. It is hence the intention of this entire study to record and reproduce pleasant, natural, atmospheric electromagnetic radiation, which does not promote disease. For hundreds of millions of years, all living beings on the earth have become used to this radiation. The above-mentioned, mostly statistical, collections of facts will support this study. In practical terms, these "positive sferics" (recorded during certain, favorable atmospheric conditions) are to be copied without falsification and fed into random, electromagnetically shielded, enclosed rooms. The resulting "positive" signal modulation is to suppress any stress from excessive technics intensities.

An appropriate filtering system for eliminating technics in such alternating signals was also made available. The above terms "favorable weather situation" and "pleasant" are related to knowledge (presented in Chapter 4 in addition to electromagnetic compatibility, etc., as per Chapter 3) of those atmospheric conditions which can be classified as stressful or pleasant.

In order to do justice to these stipulations, it proved to be advisable to ask several people about their individual well-being, in parallel with daily sferics recordings. Often, different persons were interviewed; so a large number of persons were involved.

The existence of horizontal (nice-weather) sferics is the basis for this work. These sferics are apparently **mainly** electromagnetically active in the AUDIO frequency range **[3]**.

This is based on sferics recording technique and equipment. These atmospheric ULF/ELF/VLF signals were recorded and analyzed all over the world **[36]**.

Apparently, the selection of the proper display and recording technology has a major influence on the quality of the desired report on the special atmospheric effects to be controlled. The display and recording technology needs to be broadband for the signal and highly dynamic.

The results of this study and of earlier ones indicate that commercially available sound records are either very narrow-band or narrowly dynamic: This is confirmed when comparing the audio signal quality of data when loading and copying it (single-channel mono WAVE files; cf. computer software system WINDOWS™). The location chosen for recordings are probably a major problem. There is usually considerable interference from industry in the near field and far field (see later chapters). For this reason, until now only in studies of the so-called "VLF Group" has it been possible to investigate and hear atmospheric alternating signals (or audio signal files) essentially undistorted by technics **[37]**. The studies investigated all geophysical, atmospheric/ionospheric and cosmic influences which produce transitional effects of ELF/VLF waves. These waves propagate via the ionosphere to the earth's outermost, lateral magnetic field.

Such sliding effects can be heard as audio gurgling (or "tweeks"; for details, refer to **Chapter 9**) or Antarctic "whistling" (**Figure 5.1, 5.2**). Unfortunately, these sounds are often distorted by technical interference. Additionally, comb-like light phenomena were observed in the sky at night. Known as "sprites", they occur, for example, during thunderstorms ("lightning discharges").

For a better understanding of the above-mentioned world-wide analyses of sferics (especially tonal sferics), it should be mentioned that exclusively electrophysical and geophysical aspects were emphasized for modeling. This electrophysical and geophysical context is essential in order to describe the causes of the electromagnetic sound and light effects discussed here.

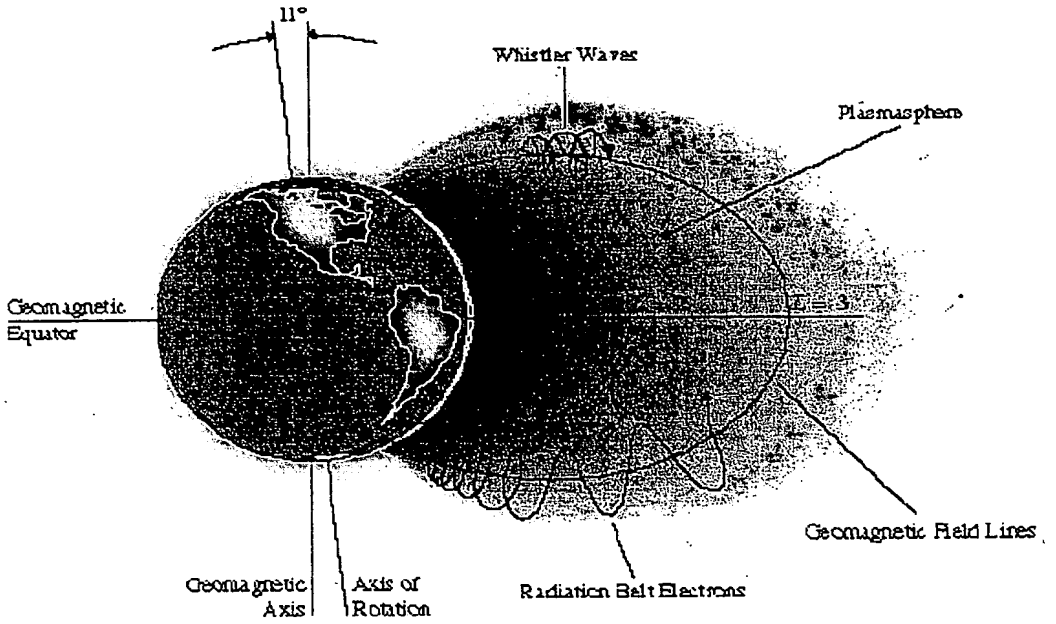


Figure 5.1: Illustration of those geomagnetic field lines which flow outside the earth's atmosphere in the plasmasphere.
The magnetic component of the sferics activities is transmitted on these field lines. During the transmission, the propagation speed of this magnetic component is reduced, as a function of frequency. This produces the lowering in tone referred to as "whistlers" (from [37]).

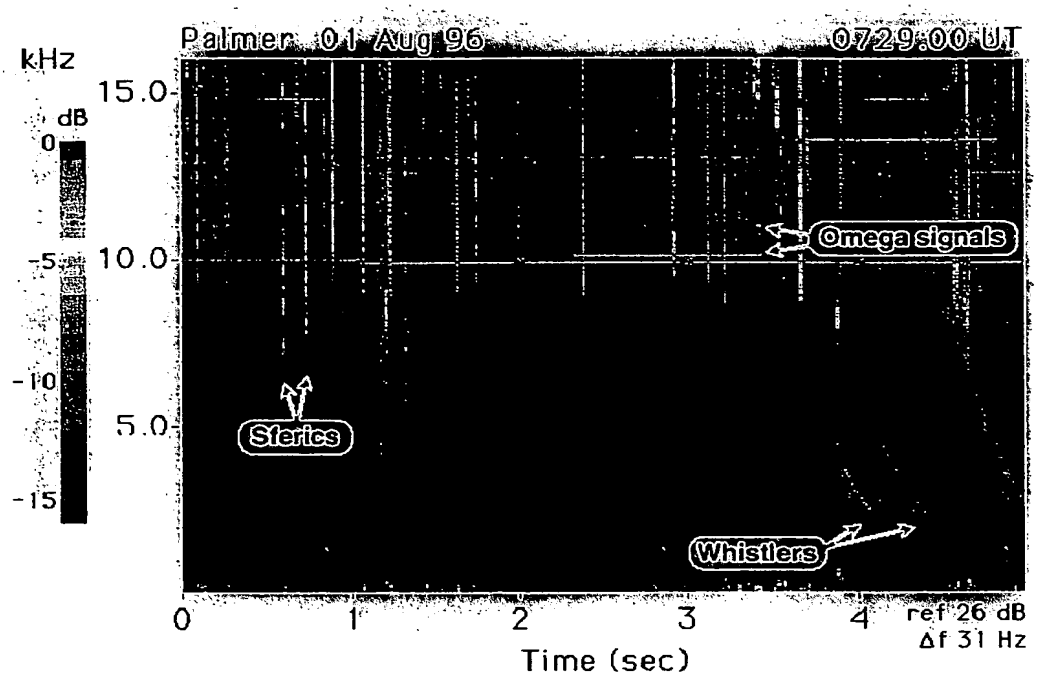


Figure 5.2: Spectrogram of atmospheric electromagnetic ELF fields recorded in the Antarctic, such as sferics, television signals (Omega signals) and "whistlers" regenerated beyond the layers of the earth's atmosphere, as in **Figure 5.1** (from [37]).

However, it does not provide the background required to describe the correlations between these electromagnetic alternating fields or signals and the biological well-being of living beings (humans). Here, however, it is desired to describe these correlations. These significant interrelationships must exist for the **search for "sferics which are beneficial to humans"**.

Hence, data on the weather situation, human well-being and conspicuous aspects of sferics signal analyses at a given point in time are of central importance in the above-mentioned investigations. These measurements were not corrupted by major interference or influences from vagabond alternating technics signals.

A hypothesis of this work is that low-pressure weather situations with primarily vertical discharges produce intensity-related partial sferics effects (at 28 kHz, **as described in [3]**).

High-pressure weather situations, on the other hand, do not produce these low-pressure effects. However, they produce sferics effects typical for each direction of air movement. When air masses flow primarily horizontally, the frequency bands below 20 kHz have a spectrum specific to nice weather. When the air masses flow primarily vertically, the spectrum probably changes (is reduced) to the bad-weather pattern typical for primarily horizontal air flow.

The same applies for the vertical direction when nice-weather effects are created or are absent.

Chapter 6
Procedure for detecting horizontal sferics burst signals

6.1. Equipment and techniques for detecting sferics activities

For the measurement of pure sferics activities, measures were taken against undesired, synthetic stray fields whose intensities are close of those of the sferics or which are present in residential/industrial areas. Further, it was vital to ensure that the measurement equipment does not emit radiation, because it would be immediately fed into the feed lines and antennas.

As a result, portable measurement and recording equipment was built on the basis of DC (batteries). Portable computers generate considerable ELF/VLF interference, so the data could not be evaluated locally. The data was evaluated later.

This arrangement made it possible to transport the equipment anywhere in the world, and to keep costs to a minimum. The essential contents and processes of the measurement procedure are shown schematically in **Figure 6.1.1**. An equivalent circuit diagram is shown in **Figure 6.1.2 [11]**

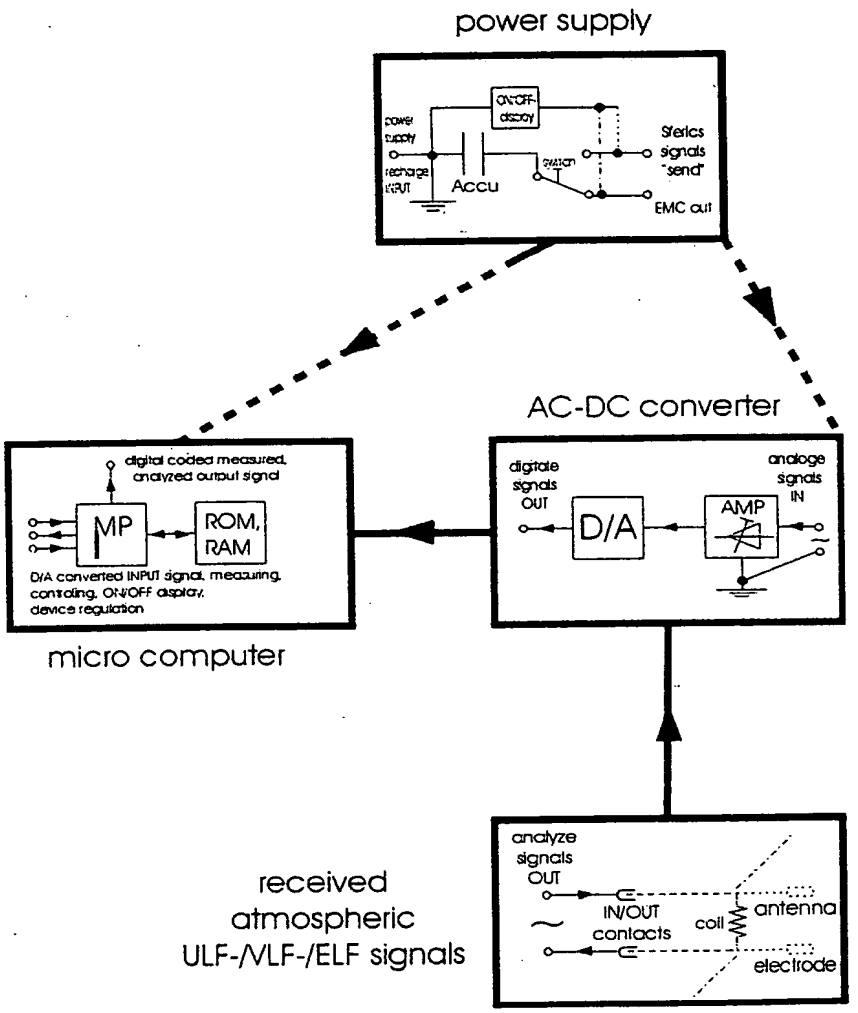


Fig 6.1.1: Schematic illustration of the essential components and procedures for fsimplified, portable recording of atmospheric alternating fields in ULF/ELF/VLF frequency ranges.
Recordings should be made of far-away sources of technical alternating fields.

Basically, an iron pipe (a separate one, lowered into the group, or an existing one) was used, which automatically grounded the reception antenna. The signals were compared by listening. As a matter of principle, the more intensive or interference-free sferics activities were reserved for later use.

Often, an appropriate steel pipe used for a road sign could be found at a location with a low level of technics. It was used as a reception antenna. The pipe should be perpendicular to the ground. A shielded cable galvanically connected with the recorder, using open stranded wire or an alligator clip, established the connection to the reception antenna. The upper third of the pipe proved to be suitable for making the connection. The shielded or ground pole was equipped with a piece of wire and an alligator clip, and was usually connected with the hand of the measurement personnel. This produced a "capacitive" coupling resistance of some kiloohms to the DAT recorder.

With this recording and measurement equipment, technical local interference sources were discovered which were not noticed initially. Sferics were recorded with less interference-related effects than would have been the case with ungrounded systems.

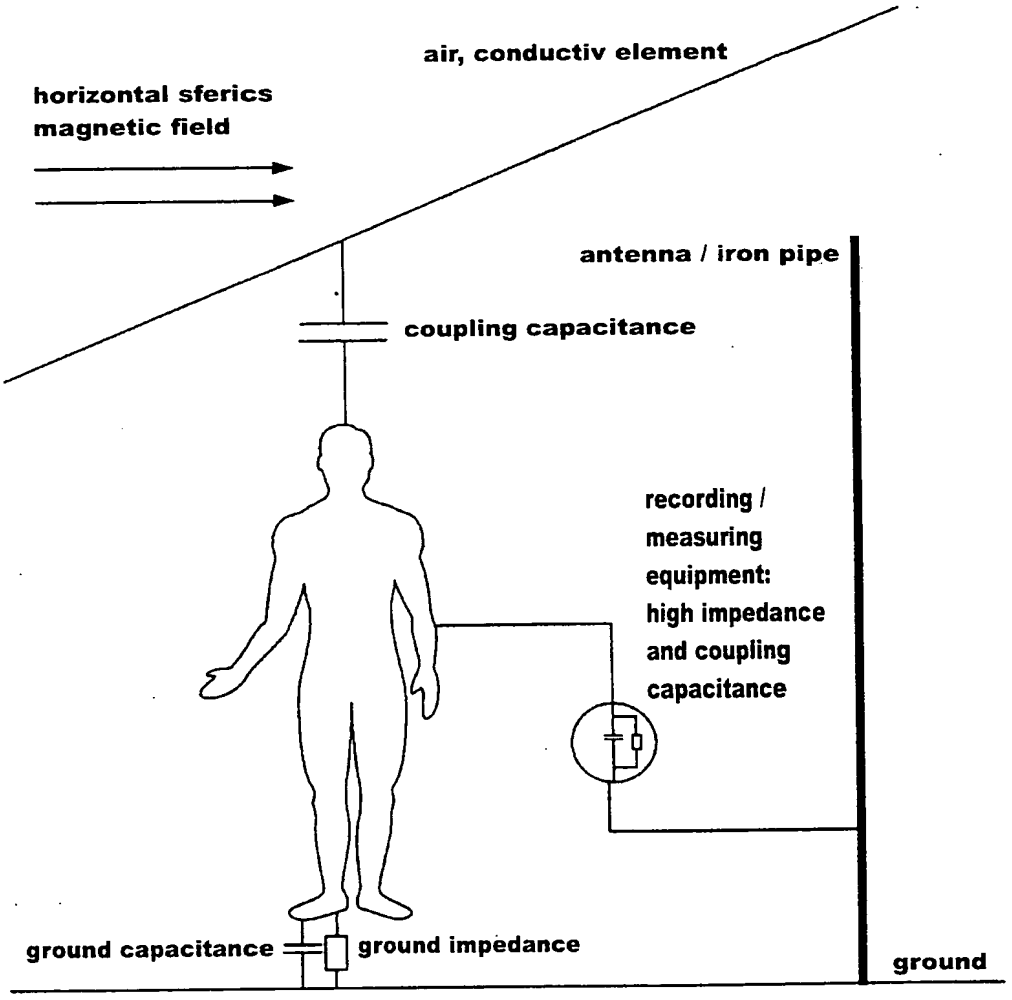


Figure 6.1.2: Electromagnetic equivalent circuit (including individual schematic elements) for detecting atmospheric alternating fields.
This illustration takes account of people and the components of interfering fields or nearby, grounded trees (refer to the connection to the ground potential). If any of these things are present, they would replace the "live lead". For this reason, sferics levels are reduced near trees and forests; or they (also technics) can be directly tapped off trees (from [11], p. 32).

For the sample procedure, a portable DAT recorder (from Sony, model TCD-D7) was used to record the low-frequency sferics alternating signals. The recorder features an aluminum housing, shielding it from radiation emissions. The microphone signal input jack was usually chosen, since it is designed to be sufficiently sensitive for AC voltages ranging from 0.1 to 10 millivolts. The LINE INPUT channel (300-mV sensitivity) was used for high-intensity thunderstorm sferics situations (mentioned later). The recording level was adjusted, of course, via potentiometer. Considering the 16-bit dynamics typical for recording technology, the level was usually set to a range below – 20 dB. This was done in order to avoid clipping strong sferics bursts by 0 dB during signal peaks. (Broadband or Gaussian burst patterns could otherwise become rectangular.)

First, a test run was made. For highly dynamic atmospheric conditions (such as a developing thunderstorm), the level was readjusted in steps. The recorded sferics alternating signals were continuously monitored by means of earphones. This made it possible to detect feedback, 50-Hz hum, intraband radio audio signals, etc. Further, it was possible to partially or completely filter out demodulated radio signal components between the ground pole of the feed line.

This was done by placing a capacitive and inductive circuit parallel to the reception antenna. This circuit was influenced or varied by the presence of the person performing the measurement (cf. low-pass effect of equivalent circuit elements as per **Figure 6.1.2; [11]**).

Without the additional components, these signal components would have been included in the measurement.

6.2. Procedure for analyzing sferics signals

If the sferics recording was useful, the signals were investigated in a computer-supported laboratory, usually soon thereafter. First, the DAT audio signal data was transferred (see **Figure 6.1.1**). If the overall signal level was low, the next step was to digitally increase the overall level, by means of an audio signal processing program.

The next procedural step depended on whether natural sferics signals or technics (synthetic alternating fields) were to be shown individually or combined, for later analysis. If only sferics were to be analyzed, then 16- and 18-kHz television, radio and telegraph signals always had to be filtered out digitally (with computer support), by eliminating narrow band segments with a steep-edged cut (90 dB over a 10-Hz edge). The so-called Omega short-duration navigation signals [37] between 10 and 15 kHz (mostly Gaussian-shaped) were of special significance (see **Figure 5.2**). Initially, these signals were not filtered out.

The lower end of the frequency range of the recording was also truncated, because of 50-Hz line voltage interference including harmonics. I.e. at locations far away from large bodies of water, it was always necessary to eliminate technics below a frequency of around 300 Hz.

The situation was different in mountains, at oceans, and at beach areas of large lakes. The earth-based fed-back line current component apparently did not have its main transmission path here (there are no loads, households or industry in the Mediterranean Sea, East Sea or in the ocean). Finally, Gibbs overshoot effects were filtered out by steep-edged cuts around 20 kHz. They were caused by the

recording technique of the DAT recorder (PCM technology, with a resolution of 16 bits, at 44.1 kHz).

A common acoustic audio signal processing program **[38]** was used to optimize the signal level and to filter out interference (50-Hz line voltage hum plus harmonics, Omega signals and 16-/18-kHz television line frequency, etc.). As a result of this acoustic processing, only those signals of the recordings remained which were desired for the subsequent spectral analysis and evaluation. Finally, the data was transferred to a 3-D spectrum analysis animation program and graphically processed by software **[39]**.

Experience with the initial analyses showed that a logarithmic display over time, frequency and intensity produced fewer spectacular effects than a linear display scale. In particular, a logarithmic scale would not have shown discrete, short bursts conspicuously (examples will be presented below). Note: As a matter of principle, the human ear is overtaxed when it is to analyze details of burst-like signals. For this reason, a time-based, three-dimensional (linear) spectrum analysis was chosen, in order to clearly illustrate temporal and frequency-dependent interrelationships and to clearly show the differences. Based on the results of **[3]**, statistically time-variant patterns in the frequency of occurrence of sferics were to be expected. It was presumed that there would be a difference in the constitution of the signal levels of the sferics components to be displayed. It was desired to relate the level-time-frequency dependency of sferics (and technics) to the weather situation and local surroundings.

The signals were monitored with earphones for many months. This much time was required to learn to perceive time differences of some milliseconds and spectral intensity variations above 6 kHz over the burst noise (psychoacoustics is outlined

in [13]). During nice weather, the sferics sound like smacking; during bad weather, they sound sharp and spike-like.

Chapter 7
Determining the weather-related effect of sferics activities from recent alternating signal recordings - biotropy

As described in the previous chapter, the natural sferics and technical fields (technics) were picked up by means of vertically-oriented antennas grounded in the earth. Two additional pieces of information were part of the description of each sferics situation:

- The current, collective well-being of humans, determined by questioning around five persons nearby (e.g. feeling good, tired, irritated, due to on general meteorosensitivity) and
- The current or emerging weather situation (beginning coldness, low-pressure area, high-pressure area, foehn, etc.).

Sometimes, this information was the reason for making a recording. It was desired to use such (usually) striking, biologically significant atmospheric conditions to bring to light a cluster of all presumed variances of possible sferics activities. In particular when several persons stated they were irritated, experience with meteorological relationships **[3, 15, 29]** could be used to conclude that the sferics had caused an negative overall situation.F urther, when the weather had a relaxing effect (such as after the influx of cold air or thunderstorms, or when a high-pressure area began), conclusions about the related sferics could be made. It was presumed that spectral analysis of the data, based on the statistics, would point out interrelationships **[3].**

Intensity-related interrelationships in the sferics activities were of secondary interest.

Chapter 8
Comparative study and discussion of biotropy caused by various sferics activities, based on 3-D spectrograms

8.1. Locations for recording sferics

From January, 2002, to September ,2002, sferics activities were measured at least once per day, nearly daily, at suitable locations. This includes geographically varied places, such as Upper Bavaria (main measurement locations: between Fürstenfeldbruck near Munich and Staffel Lake near Garmisch-Partenkirchen), the Lake of Constance, the Staigerwald area of Würzburg, the Götzenhain area of Offenbach, Bochum (all locations in Germany), South Tyrol (Val di Fassa at an altitude of 2,000 meters), Italy at the Mediterranean Sea (Lido d. Estensi,

Ravenna), the Canary Islands (La Palma), Tennessee (Nashville), Washington, D.C., and in the area of the North and East Seas, up to southern Sweden (the islands of Gotland and Oeland).

This provided the basis for determining differences due to location. H. Baumer [3] had pursued this issue less intensively; his work was based primarily on a statistical analysis of the sferics' frequency of occurrence. Occasionally, it was not possible to make recordings:

- First, a broadcast radio transmitter for the kHz/MHz transmission frequency range was located a few kilometers away. This transmitter produced voice and audio signals, demodulated directly by grounded and ungrounded metal antenna elements or trees and shrubs. (These signals could be heard without a radio receiver, e.g. around Ismanning near Munich or around Holzkirchen, in Upper Bavaria.) In this vicinity, no sferics recordings can be made if there are no local thunderstorms.
- Second, even at a distance of some hundred meters overhead power lines with a voltage of at least some kilovolts (three-phase current) increasingly corrupted sferics recordings, adding hum (including harmonics).

For these high-voltage cable systems, it sufficed to maintain a distance of around one kilometer. It sufficed to maintain a distance of some ten meters between single-cable three-wire systems (lowered in the ground) and the grounded measurement antenna (a small amount of residual hum was accepted).

- Third, it was quite difficult to make sferics recordings in Nashville, Tennessee. A wide variety of single/multiple supply voltages (60 Hz, overhead power lines carrying 1,000 to 20,000 volts) were found in relatively densely populated rural areas. These power lines were placed next to one another at a

distance of some (ten) meters or in chaotic, crisscross patterns. There seemed to be no uniform arrangement.

In most cases, it was only possible to make recordings influenced by the 60-Hz alternating field. It was totally impossible to make measurements using trees or shrubs electrically connected to the ground. In the woods, no sferics could be picked up. The overall level was grounded by the treetops, which covered the trees like a cage.

8.2. Preliminary attempts to determine the optimal procedure for recording sferics

In January, 2002, work began on measuring sferics by means of various recommended forms of coils **[40]**. Coils were used having at least some hundred windings. Additionally, coil types in accordance with Tesla were tested (cylindrical and flat coils) as well as coils with 15,000 and 175,000 windings, for inductivities of up to some Henrys. The internal resistances ranged from some ohms to some hundred thousand ohms. The frequency responses (high-pass behavior) and resonances of these coils were also measured. Some of them were designed specifically for very low ULF/ELF/VLF frequency ranges (Schumann resonance).

A suitable coil had a resonant frequency at 4.7 kHz with high sensitivity. However, this appeared to be insufficient for broadband sferics recordings (coil sensitivity linearizations by means of compensations would have been necessary).

Used as VLF high-pass filters, the cylindrical coils seems to be better suited for broadband measurements. However, their ELF/VLF sensitivity proved to be insufficient.

After a few weeks of tests, sferics bursts were perceived and recorded. However, the signals were too weak and "dirty":

- below the minimum sensitivity of the microphone input of the DAT recorder,
- 50-Hz stray fields were the main signal and
- mobile radio and DECT telephones caused interference.

Additional experiments were then performed, the literature was studied and demonstrations **[40]** were made which pointed to interfering fields coupled in via ground wires and water household lines. It was shown that this coupling effect occurs always, independent of location. This lead to the idea of directly using large metal (in nature, self-supporting) objects as reception antenna in surroundings free of technical radiation (cf. ferrite antennas).

This quickly proved to be much more effective, especially since the wavelengths of sferics alternating signals offered a certain amount of freedom, i.e., approximate independence from antenna length. Electromagnetic signals between 30 kHz and 3 kHz have wavelengths ranging from 10 km to 100 km.

That enabled a reception antenna of around 2 meters. This antenna receives all signals from 20 to 20,000 Hz with uniform intensity, independent of the frequency and intensity.

Vertical road signs or metal columns (usually lowered into the ground and sufficiently grounded) proved to be ideal reception antenna elements. On the other hand, metal objects with dimensions greater than three meters were (literally.) heard to possess the properties of a broadcast receiver.

Whenever these effects were noticed, they were eliminated by coupling the above-mentioned capacitive and inductive elements, or by establishing a galvanic connection to the person performing the measurement. In other words, when the sferics were recorded in the evening or night the sferics audio tone signal was disturbed by a vagabond radio signal component with a varying signal level. Apparently, the latter was demodulated by the vertical reception antenna element and was recorded in the demodulated form. It could be heard via the recorder.

Hence, it was always recommendable to perform measurements and such optimization experiments before recording the sferics. This way, audible interference fields (such as broadcast transmissions, power line hum as per **Chapter 8.1**) could be minimized.

For these reasons, currently available, analog/digital series filter units were not employed. This made it possible to detect sferics virtually free of technics, without (modulation) pulling effects.

Therefore, the sferics recordings were always checked aurally in real time, with headphones.

Chapter 9.5.2 discusses further reasons for the described procedure (see Detection of natural ULF/ELF/VLF signal components), a coincidental result:

For the sferics signal analysis, the permanent field signal components at around 16 kHz and higher were digitally filtered out, with narrow-band cuts. However, initially the pulsing Omega signals around 12 to 15 kHz (see **Figure 5.2**) were retained in the recordings.

This is an extraordinary result. It is placed here to enhance comprehension , although the topic will be dealt with in a later chapter. The reason has to do with the reference level of Omega signals in comparison to sferics burst levels. The level comparison corresponds with the particular weather situation I.e., this made it possible to relate the sferics activities to weather phenomena in a simplified manner (see **Chapter 9.5.2**). This could be done independent of (for instance) statistics on the frequency of occurrence (cf. **[3]**) regarding the intensity relationships between technics and AIS.

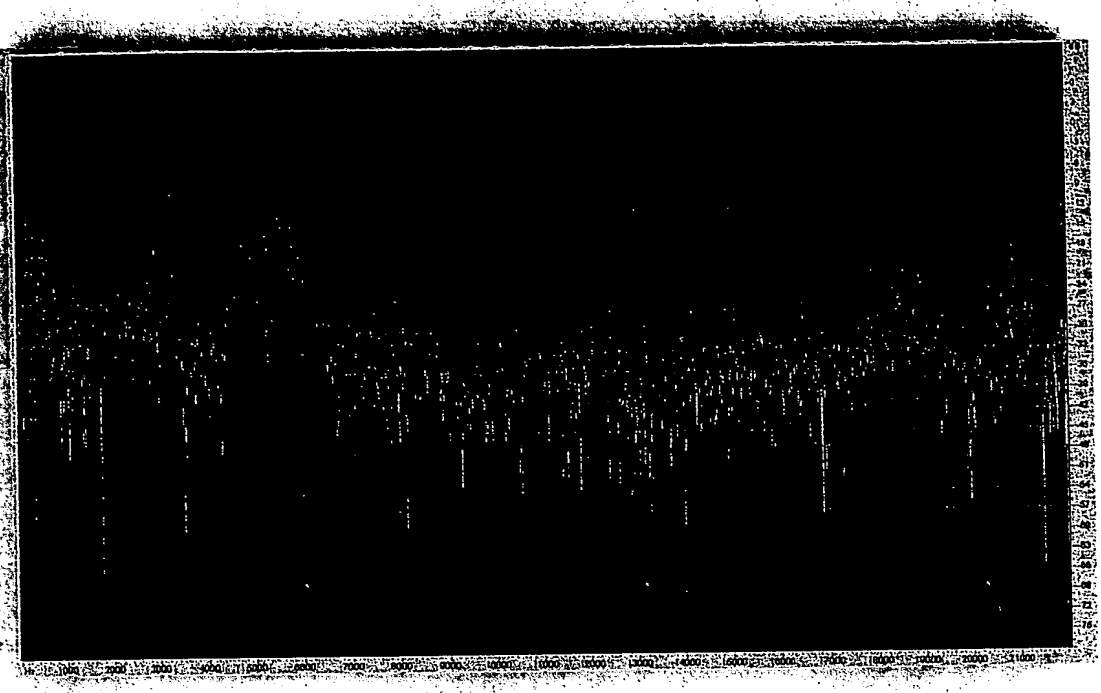


Figure 8.3.1: Two-dimensional spectral analysis of an atmospheric alternating signal/burst signal recording made near a transmission tower for various high-frequency signal transmission services.
This recording was made on 3/26/2002 in Götzenhain, Germany, near Offenbach. The weaker sferics cannot be recognized at all or are difficult to pick out, compared with the demodulated **technics** components.

8.3. Setting up a comprehensive library of recordings of sferics alternating signals

The procedure for detecting and analyzing sferics alternating signals is described above.

At this point, it should be emphasized that the investigation of sferics (and technics) was not primarily concerned with statistics on the frequency of occurrence (in contrast to **[3, 29]**). Rather, the focal point of the foreseen analyses was the **intensity** of the spectral signal contents and structure.

The topic of the intensity of AIS is primarily relevant against the backdrop of media discussions of field limit values of electromagnetic signals to which humans are exposed **[11, 35]**. A major question is: Is the effect of technics signals related only to their intensity; or does the signal shape also play a role **[26]**? I.e., is the public and scientific discussion focused on the right contents?

However, biotropical indications of the weather (in accordance with **[3, 29]**) were taken into consideration. In parallel to the sferics recordings which were made, the human environment was explored by observing or querying at least five (randomly available) persons about their current well-being.

When the weather was exceptional or human well-being was conspicuously different, numerous sferics field measurements were made the entire day. The sferics recordings which were made, transferred to a computer and later analyzed (as per **Chapter 6)** were systematically cataloged based on the current weather situation, in order to create an archive of recordings.

After digital audio signal processing by means of **[38]**, the data was transferred to a 3-D spectrum analysis animation program **[39].** In the spectrum, the expected level changes could be displayed as multiple-color elevations, in terms of time (Z-axis) in addition to the color coded frequency-dependent level (Y-axis). This resulted in a mountain-like graphic, rather than a multiple-color, two-dimensional spectrogram (see **Figure 8.3.1;** described in detail in **Chapter 10.2**). In addition to these parameters, it was possible to choose a linear or logarithmic scale for intensity and frequency.

With software, any time slice to a maximum length of 50 seconds could be examined and shown graphically. This was done in order to document finite portions of interesting parts of sferics activities in specific time slices. (In accordance with the figures mentioned above, the resolution ranged from seconds to milliseconds.)

All sferics recordings were stored in sequence. The format used was that of an audio storage medium (DAT tape), with a typical WINDOWS™ .wav file in the computer and a graphic file for the 3-D spectrograms. For precise analysis, the three-dimensional spectral analysis graphics were presented from various angles. This proved to be important, especially since for certain atmospheric conditions some narrow, usually steep-edged bursts were visible and could be analyzed only when viewed from a frontal bird's-eye view (cf. X-axis; see **Figure 8.3.2**). When viewed from the Y-axis (e.g. **Figure 8.3.3** which is the opposite case, and cannot be analyzed), these bursts are masked.

When unusual effects were indicated on the time axis of the sferics activities, the view was rotated 30/60/90 and the graphic was shown with the X-axis in front

(running from left to right; see **Figure 8.3.2**). The basic consideration and motive of this overall study was the following.

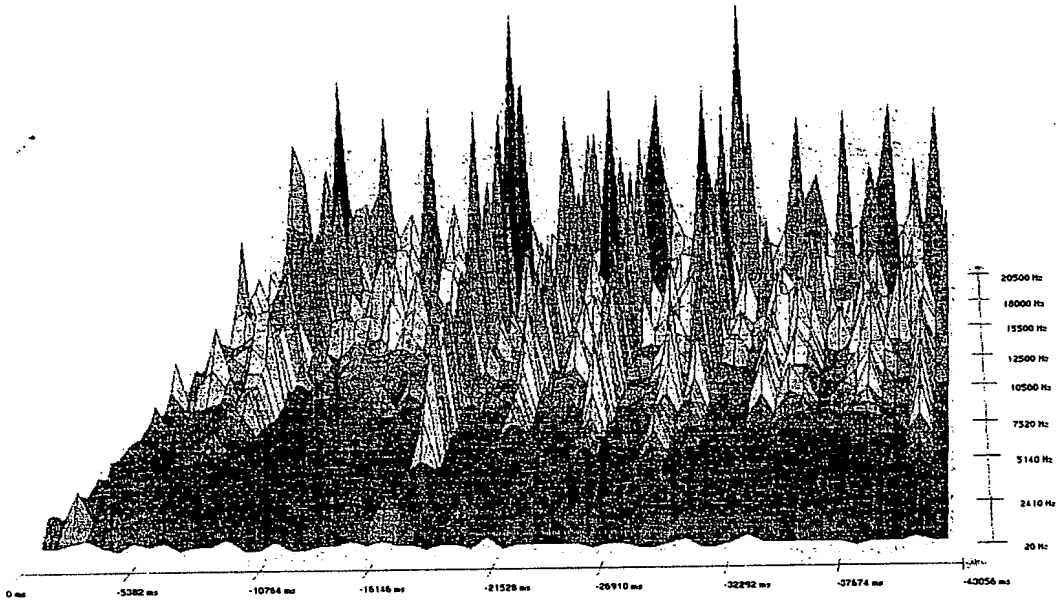


Figure 8.3.2 Understanding of spectrogram structures is improved by showing atmospheric alternating signals mixed with Omega signals in three dimensions, from the front.
The signal was recorded in Gilching, Germany, near Starnberg. On the day of the recording (4/10/2002, at 11 p.m.), the meteorological situation can be described as follows: low stratus clouds, hazy, around 24 hours before a weather upheaval, people felt slightly aggressive. Conspicuous Omega pulses at 15 kHz and some lower-intensity Omega signal components at 12.5 kHz as well as broadband burst discharges relating to the warm air indicate a low-pressure area in the vicinity.

It was desired to store sferics signals with a biologically beneficial effect (as demonstrated in **[3]** for recently formed high-pressure areas, for example) as sound recordings.

For every conceivable point of view, these signals should contain the best properties for extremely positive biotropy effects **[3]**.

For this reason, dummy runs were made with test persons; this is described later in detail. It was desired to verify if any spontaneous, subjective effect can be determined. And if so, then based on these dummy runs with test persons, it was desired to select those AIS sound recordings which in sum produce the most positive short-term biotropical reports.

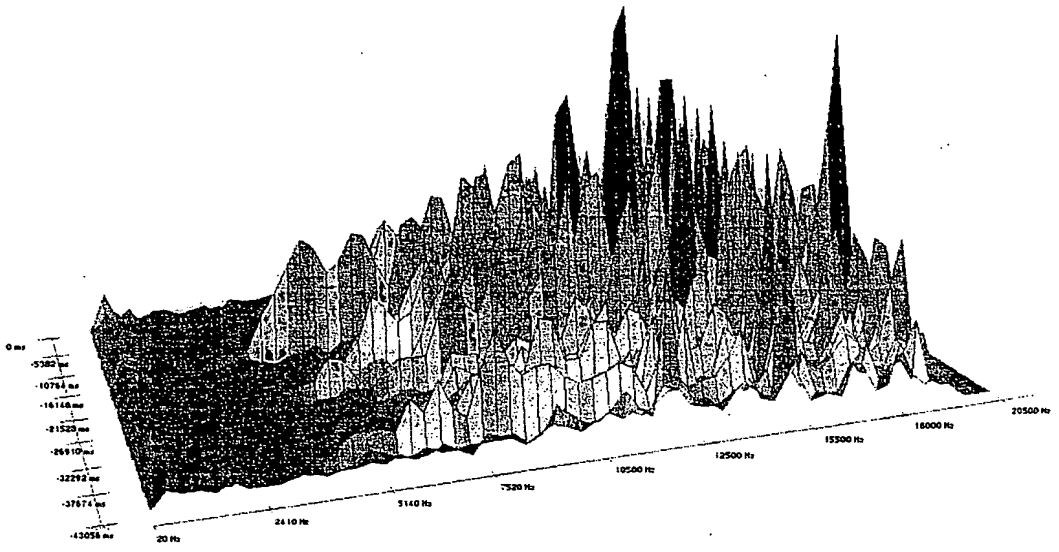


Figure 8.3.3: Graphic rotated 90 degrees, based on **Figure 8.3.2**. It is an improved, lateral view of the structures of the 3-D spectrogram.
Refer to **Figure 8.3.2** for detailed data on the atmospheric alternating signal recording and the corresponding meteorological situation.

Chapter 9
Spectrum analysis of atmospheric alternating fields

9.1. Sferics of various atmospheric conditions

As mentioned at the beginning, sferics activities were recorded on an ongoing basis. I.e., sferics samples (see digital recordings/tracks/titles) were chosen depending on the momentary possibilities of the experimenter. For this reason, some noteworthy **exemplary** weather data is listed here. For reasons of clarity, the related AIS recordings will be discussed and analyzed later, in **Chapter 10**, in accordance with **Figures 10.2.1** to **10.2.12**:

- On the Canary Islands/La Palma: stabile, nice weather, narrow-band sferics detection using a coil with a resonant frequency of 4.7 kHz (recording in 1985).
- On the island La Palma 50-Hz interference, nice weather, somewhat instable (in the evening, dusk, 2/8/2002).

The situation is characterized by broadband sferics bursts centered at the mentioned resonant frequency. Physical/psychological well-being was noted as being relaxed.

- A high-pressure area, currently being formed, directly at the Lake of Constance (in the evening, 3/29/2002). The situation is characterized by Omega/Gauss bursts stochastically spread over time, mixed with broadband bursts in a frequency range starting at 5 kHz to at least 18 kHz. Physical/psychic well-being was noted as being relaxed. On a mountain top in South Tyrol (at an altitude of 2,000 m, am 4/4/02 at 4 p.m.), a layer of snow, one day before a bad-weather front, in the afternoon. The situation is characterized by intensity-related conspicuous, "piercing" 15-kHz Omega bursts and signal sequences for an approaching low-pressure area: the sun was still shining and there was slight cloud cover. Physical/psychic well-being was noted as being slightly irritated, somewhat tired or "downtrodden".
- An "aggressive" afternoon weather situation with some cirrus cloud cover starting in the afternoon, 17 degrees Celsius warm/dry in February (winter time.); sudden onset of cold weather was imminent, the temperature dropped 20 degrees Celsius and snowstorm still the same day at 10 p.m. (recorded in Alling in Bavaria, on 2/23/2002). The situation is characterized by 12 kHz and primarily 12.5-kHz Omega signals for an approaching, massive sudden influx of cold air (the temperature dropped 25 degrees Celsius). Physical/psychic well-being was noted as being exceedingly aggressive, rough. Around noon, unusually many people "were involved in arguments" (around 50 people were observed in the vicinity for six hours).
- Post-foehn sudden onset of cold weather, cool, cloud cover, it began to rain (3/15/2002, 6 p.m.). The situation is characterized by 12/12.5 kHz and highly

intensive Gauss burst-like 15-kHz Omega signals (nearly no broadband bursts) for an approaching, wide-area low-pressure area with a less-conspicuous temperature drop. Physical/psychic well-being was noted as being oppressively tired/unambitious.

- A layer of snow, sunny-cloudy (0 degrees Celsius, after a cold front had passed through, 3/25/2002 in the afternoon); before a major earthquake in Afghanistan (with regard to packet-like anomalies in the sferics picture, refer to **Chapter 9.5**). The situation is characterized by 12/12.5 and somewhat dominating 15-kHz Omega bursts and signal sequences after a cold front had passed through. Alternatingly sun, clouds and snow showers, and a 3-cm layer of snow. Physical/psychic well-being was noted as being a mixture of slight stimulation/excitement or slight tension, but not very tired or unambitious.

In conjunction with **Figures 10.2.2** to **10.2.7**, the recognizable properties of Omega broadband bursts (as summarized here) can be reduced to the following, biotropical relationships: The more (broadband) **sferics burst frequencies** are chaotically mixed, the less aggressive or agitating is the weather situation. It tends to have a relaxing effect.

For the categorizing frame of reference of this work (a measure for the stressful effect of sferics), the **dynamics** between the sferics burst components is also essential. De facto, even fairly uniform sferics burst noises without isolated strong bursts or "crashes" can be **heard**.

As described above, they should be viewed as not very stressful or aggressive. This is very significant for the optimal sferics alternating signals for a nice-weather situation **which it is desired to find**.

The opposite or reverse applies with regard to imminent weather changes or approaching thunderstorm cells (see **Chapter 9.3**). As an example, this will be

explained for clear, cloudless sunny weather, based on dozens of sferics recordings made early in the morning in the summer (in the year 2002): The initial impression was that the meteorological situations were identical. However, for some of the recordings, the "crashes" mentioned above could be directly heard or picked up and analyzed several times per minute; for other recordings this was not the case. Without consulting local radio or TV forecasts, even after a few weeks it became clear that these fairly strong, atmospheric single discharges were a precursor for imminent thunderstorms in the vicinity. A comparable interpretation was possible, based on the sferics audio signals. Single sferics discharges occurred increasingly for at least an entire day, accompanied by higher overall sferics signal dynamics. Local cirrus clouds indicated that storms were being formed a few hundred kilometers away, with summertime low-pressure troughs, etc. When the sferics signals were heard as a uniformly dynamic "cracking" or "sizzling", then weather deterioration or change (passage of a front) was not expected locally or farther away (stabile high-pressure area).

Briefly summarized, in this context temporally infrequent alternating signal characteristics or structures with conspicuous intensities acquired special significance. They had temporally variably occurring Gaussian burst-like Omega signal sequences, primarily at the frequencies 12/12.5/15 kHz or mountain-like broadband bursts (the sferics). In the corresponding oscillograms or signal time waveforms, this can be seen as slowly settling/decaying, relatively long-lasting (single or multiple) Gaussian bursts or brief (single or multiple) Dirac-like bursts or pulses. (The time behavior is shown in **Figures 4.1.1, 4.1.2** and **4.1.3**.)

Independent of the overall sferics signal dynamics discussed here, a predominance of Omega signals (12 kHz or 12.5 kHz) indicates meteorotropically agitating or aggressive effects on people (such as foehn weather in Bavaria). This is related to

the noteworthy frequencies and the biotropical information they contain **[3, 30, 31, 32, 33]**. The opposite (feeling tired, unambitious, and depressive tendencies) correlates closely with Omega signals occurring exclusively at 15-kHz (weather with continual rain, such as in low-pressure areas). This results in numerous occurrences of Omega signals to be analyzed, combined with more or less dominant broadband bursts or sferics. This linear (uniform) transition correlates with feeling relaxed, placid and harmonious.

Finally, in the 3-D spectrum analyses pulsating technics (Omega signals) which are not filtered out appear to simplify the weather-related evaluation of sferics recordings. However, the real, meteorotropical information for human life (in accordance with **[3]**) should be found in the individual burst spectra and their discrete, spectral intensity. In the figures of the following chapters, this can be seen repeatedly. Depending on the meteorological situation, the spectral level peak value seems to vary as a function of frequency for each discrete sferics discharge.

Starting in the spring, a brief gurgling sound (cf. tweeks, **Chapter 5**) was increasingly heard. This sound occurred during dusk (starting after sunset) with each burst. This was in contrast to a sizzling sound (such as when drops of water are sprayed into a greasy, hot pan). This was perceived increasingly as the night wore on.

These audio effects have a falling pitch. On the time axis of a 3-D spectrogram, this pitch can be seen as a slanting broadband burst. (At the beginning, the signal level is greatest at a high frequency, it ends at a low frequency, as in **Figure 9.1.1;** the example is taken from **Figure 10.2.3).** Such effects appear to have their maximum in the form of "whistlers", described above (see **Chapter 5**). These effects are probably caused by the long propagation paths of the sferics near-field discharges (mentioned above). These paths include cosmic areas.

Based on the sferics properties described above, it is probable that the sferics have certain, electromagnetic pass-band properties. Further, certain electromagnetic atmospheric pass band filter properties can be presumed, based on the described sferics characteristics. These atmospheric signal filter properties are based on various weather situations, including the related wave transfer resistance. The waves are transmitted from the atmosphere into space. This takes place, for instance, during low-pressure weather situations with considerable precipitation via great distances to the measurement site (see also the influence on technics: Omega signal intensity between 12 and 15 kHz). With regard to various temperature levels, the relationship is: the colder, the lower the overall sferics level.

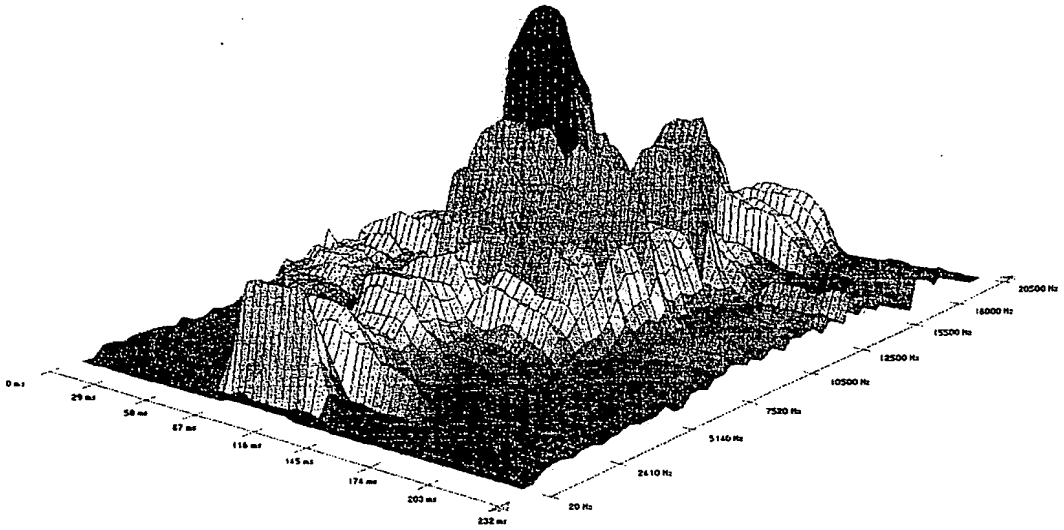


Figure 9.1.1: Three-dimensional spectrogram analysis of a broadband pulse, which often produces "tweeks" (a **gurgling sound**) which can be heard for night-time sferics recordings.
In the high-resolution time axis [t/ms], a tonal component can be recognized (pitch continually decreasing). It begins with a main discharge flow containing high frequency components (t = 30 ms). Over a period of 80 ms, its intensity extended to low frequencies. This recording was made on 3/29/2002 at 10 p.m. in the town of Wasserburg at the Lake of Constance, Germany, in a "young" high-pressure area; the evening air was clear.

Correspondingly, the wavelengths (10 km, 20 km, 24 km, 25 km as well as 30 km; frequencies 30 kHz, 15 kHz, 12,5 kHz, 12 kHz and 10 kHz) can be calculated, based on the sferics/technics signal structures or sferics/technics atmospheric conditions. These wavelengths are presumably due to more than merely physical air layer effects of the horizontal propagation direction of the sferics. This is like electromagnetic wave resonance effects caused by atmospheric reflections at various air and inversion layers, etc.

The discussion of causes and brief discussion of data will be discontinued at this point, since the work discussed here has other objectives. – Namely, to record and select pleasant and healthful nice-weather fields.

In **Chapters 4** and **5** the notion was mentioned that vertical and horizontal movements of air masses determine a certain, system-theoretical interrelationship in the horizontal and vertical sferics patterns. This system-theoretical interrelationship depends on the varying spectral intensities. (See also the influence on technics: Omega signal intensity between 12 and 15 kHz.) This notion was confirmed here, and is not a singular case. Hence, the sferics/technics analysis results can be reproduced or repeated for each weather situation.

9.2. Sferics and the influence of geographical position and time

During the process of comparative analysis of sferics/technics signals, it was considered to be important to record the alternating field signals at multiple locations. For this reason, appropriately portable sferics recording and reception equipment was taken along on many trips. This way, significant sferics signals could be recorded.

Sometimes, for example, recordings were made northwest of Munich, followed by recordings an hour later at the edge of the Alps, around 100 km away. The initial result was that the Alps must have some electromagnetic influence which reflects ELF/VLF waves, in conjunction with snow cover distributed over a distance of hundreds of kilometers.

During the first recording (near Munich), weather situation-significant Omega single bursts were detected at **12 and 15 kHz**. In frequency and time, they occurred at least twice, i.e. doubly (like echoes), in the later recording near the Alps. However, this hypothesis is doubtful. The respective wavelengths of the Omega signals (12 to 15 kHz) would be too long for such effects.

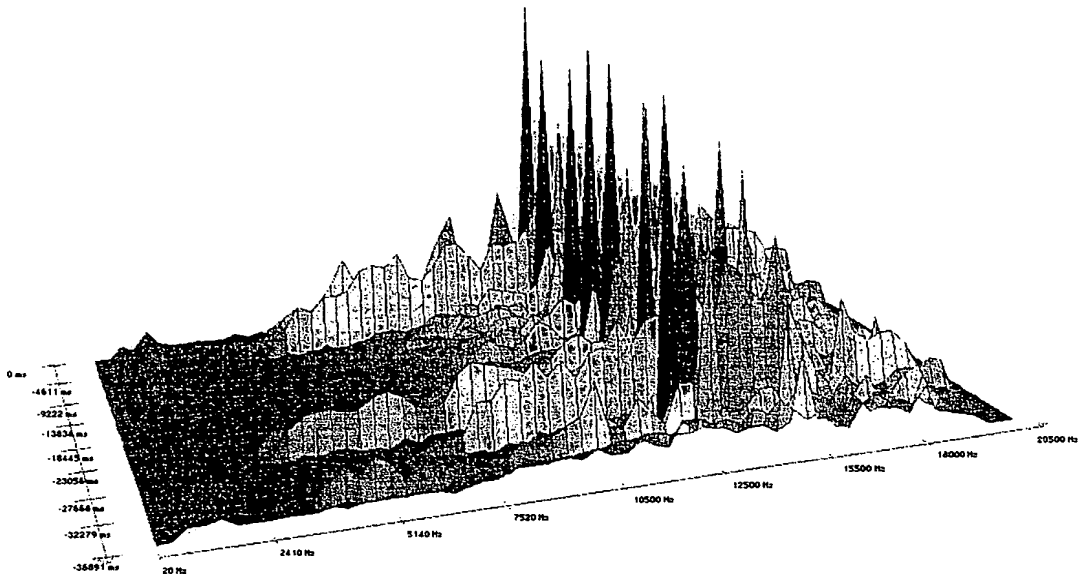


Figure 9.2.1: Three-dimensional spectrogram analysis of sferics activities on 3/14/2002 at 6:30 p.m. (recorded at Iffeldorf/Penzberg, Germany).
The related meteorological situation can be described as follows: Shortly before a northern Alp foehn weather situation dissipated (the foen changed to rain). Overcast, a few hours before a weather upheaval and influx of cold air. People felt irritable/aggressive. Visible, relatively weak Omega signal components at 15 kHz and the Omega signal components at 12 and 12.5 kHz which are level-dominant for the foehn as well as lower-intensity broadband burst discharges indicate a low-pressure area in the vicinity (refer to the phenomenon known as foehn).

In addition, there were issues concerning geographical sferics structure properties relating to the well-known weather phenomenon of northern Alp foehn. The main Alp crest dries damp air masses entering from southern directions (low-pressure area over west Italy/Genoa). The result is sunny weather in, for example, Upper Bavaria despite low air pressure. Corresponding sferics analyses show that reference to AIS or technics explains how a weather situation can form which is

generally perceived as stressful or aggressive. (This corresponds to the situation shown in **Figures 9.2.1, 9.2.2**. and others.)

A high-pressure area with broadband bursts gradually transitions to warm-air sectors, which are usually less stabile. Initially, cirrus clouds are seen, at an altitude of at least 10 km. These warm-air sectors filter the generated far-field discharge bursts in the atmosphere on their way to the measurement site.

The following two phenomena result from this:

- Increasingly the above-mentioned sferics and technics components at 12 and primarily 12.5 kHz (influence of warm air) and later also at 15-kHz components are passed through to the measurement point;
- At the frequencies 12/12.5 kHz, sferics and technics with relatively intensive signal levels conform meteorologically with stressful or stabile (long-term) foehn (s. **Figure 9.2.1**).

The broadband bursts are reduced, as the situation becomes increasingly instable. Often, there is also a sudden onset of cold air. The mentioned 15-kHz Omega signals also dominate the spectrum (see **Figure 9.2.2**). At this point, it should be mentioned that the dominance of 12-kHz Omega signal sequences (however, not 12.5 kHz) is almost certainly directly related with sudden, approaching onsets of cold air. Effects of near-by bodies of water could be shown in 3-D spectrograms, which were also conspicuous. Examples are the Mediterranean Sea or the ocean (at Africa/La Palma, cf. **Chapter 10.2**). These bodies of water had an equalizing effect on the weather events, resulting in fewer (temperature) variations. Hence, they had an influence on the AIS.

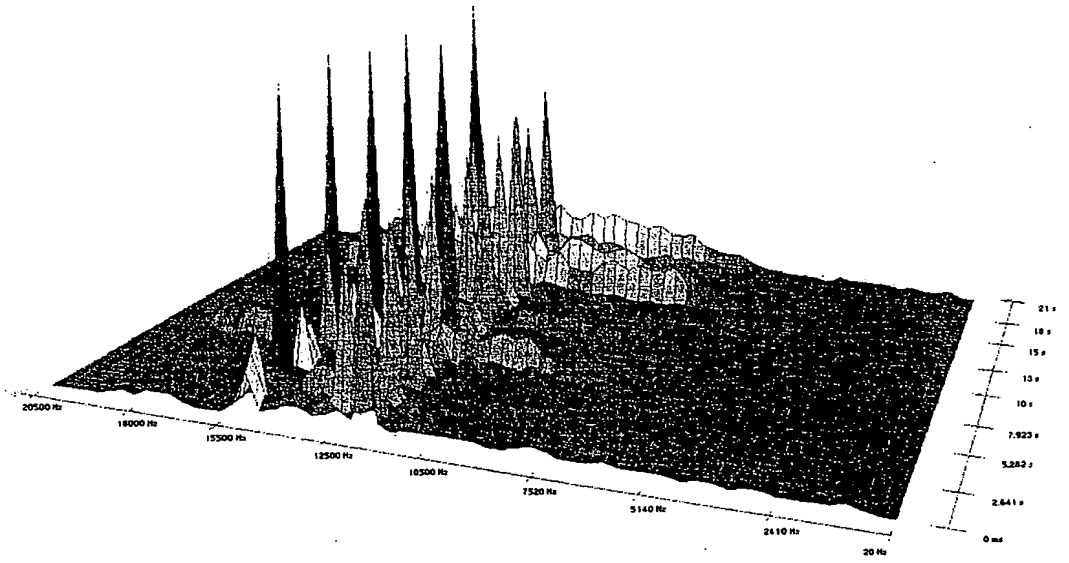


Figure 9.2.2: Three-dimensional spectrogram analysis of sferics activities on 3/15/2002 at 10.00 a.m. (recorded at Iffeldorf/Penzberg, Germany).
The related meteorological situation can be described as follows: Northern Alp foehn had dissipated, the area was still in the warm sector, overcast, hazy (a few hours before the beginning of rain and low pressure). People felt tired and somewhat irritable or slightly aggressive. Conspicuous Omega signal components at 15 kHz, a mixture of 15-kHz comparatively weak Omega signals at 12 as well as 12.5 kHz and low-intensity broadband pulse discharges indicate a low-pressure area in the vicinity.

Independent of the weather situation, for all recordings the following differences to the continental climate were observed:

- with regard to frequency, more dominant bursts with broadband components were recorded,
- these bursts can be seen (at time X) as continuous, wavy, but rounded and mountain-like spectral walls (rising, starting at some kHz and declining by around 16 kHz), next to brief, narrow-band bursts (see **Figures 9.2.3** and **9.2.4**).

This was the case even though the weather was bad (rainy, etc.).
By contrast, in terms of frequency spectrum the continental climate produced highly-dominant Omega signals and brief near-field bursts during relatively aggressive or bad winter and spring weather. In terms of signal levels, such weather produced weakly intensive, step-like broadband sferics discharges. These discharges varied with the weather situation (see **Figure 9.2.1**). During thunderstorm discharges, the broadband sferics display a low-frequency, spectral peak level. This will become evident below.

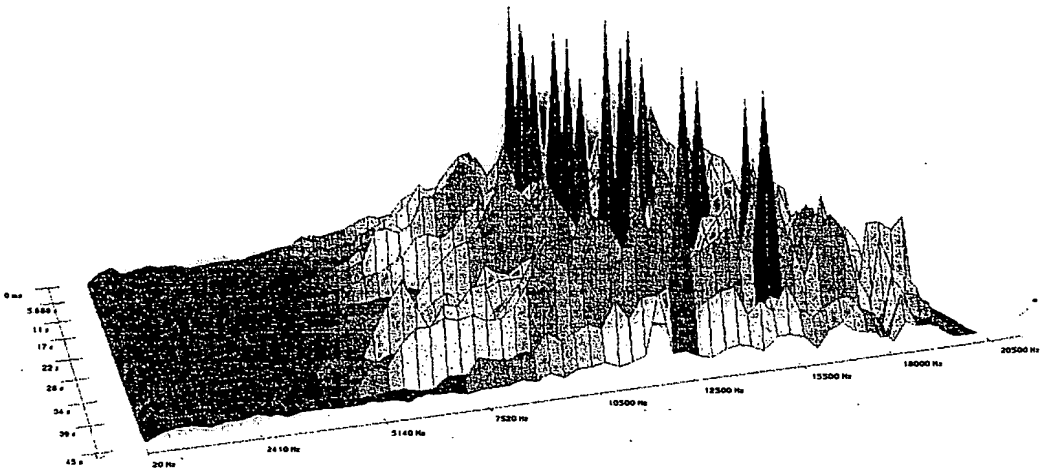


Figure 9.2.3 Three-dimensional spectrogram analysis of sferics activities on 5/1/2002 at 1.00 p.m. (recorded at Lido Estensi/Ravenna, Italy).
The related meteorological situation can be described as follows: Weather upheaval currently in progress; it has not yet begin to rain for a low front (warm sector). Overcast, a few hours before rainshowers began, windy. People felt tired and slightly irritable. Conspicuous Omega signal components of uniform intensity at 12, 12.5 and 15 kHz as well as comparatively weak broadband burst discharges indicate a low-pressure area in the vicinity (warm air, near the ocean).

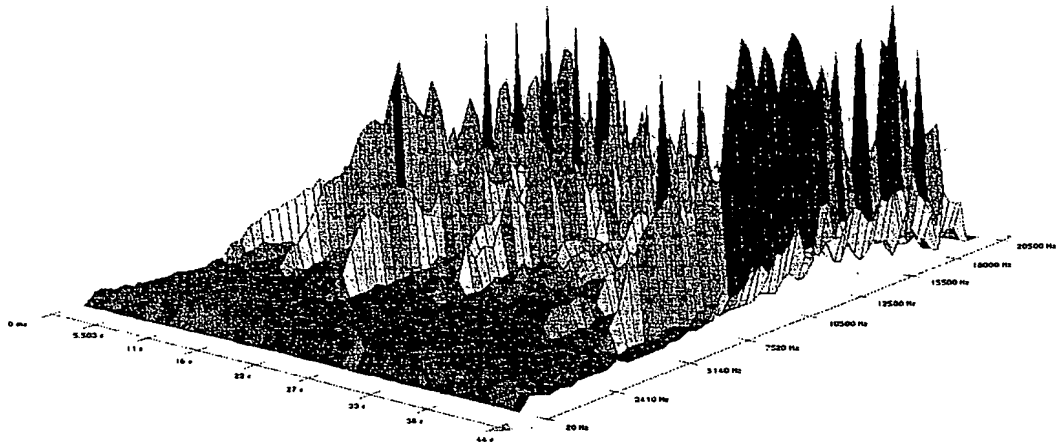


Figure 9.2.4: Three-dimensional spectrogram analysis of sferics activities on 5/2/2002 at 6.00 p.m. (recorded at Lido Estensi/Ravenna, Italy).
The corresponding meteorological situation can be described as follows: overcast, continuous rain, in a low-pressure system, warm sector, trend to thunderstorms (it was the same way at a distance of around 20 - 30 km). People felt weary. Still visible Omega signal components at the frequencies 12, 12.5 and 15 kHz with relatively dominant AIS or broadband pulse discharges (compare with the situation near a thunderstorm, etc.) are evidence of the described low-pressure weather situation, including a warm sector.

The following **invalid** hypothesis could be derived: Over large water surfaces (Mediterranean Sea, oceans, etc.), the "hard, atmospheric bursts" encounter a yielding surface, which conducts in an electromagnetically different manner than does the continental mainland ground, including the atmospheric layers. For these considerations, the wavelength of the sferics (some ten kilometers) must be taken into account.

Only the following fundamental considerations argue against this hypothesis: The purely magnetic field component of the sferics (which remains over great distances) is propagated in the horizontal and vertical direction.

The distance, geographical position and the weather situation must be seen as variation parameters. The analyses of **Figures 8.3.2** and **9.2.3** (varying frequency/time behavior in the 3-D spectrogram) also underscore this fact. I.e.,

- temporally longer and briefer bursts
- mixed at various frequencies
- with broadband or narrowband Omega signal sequences.

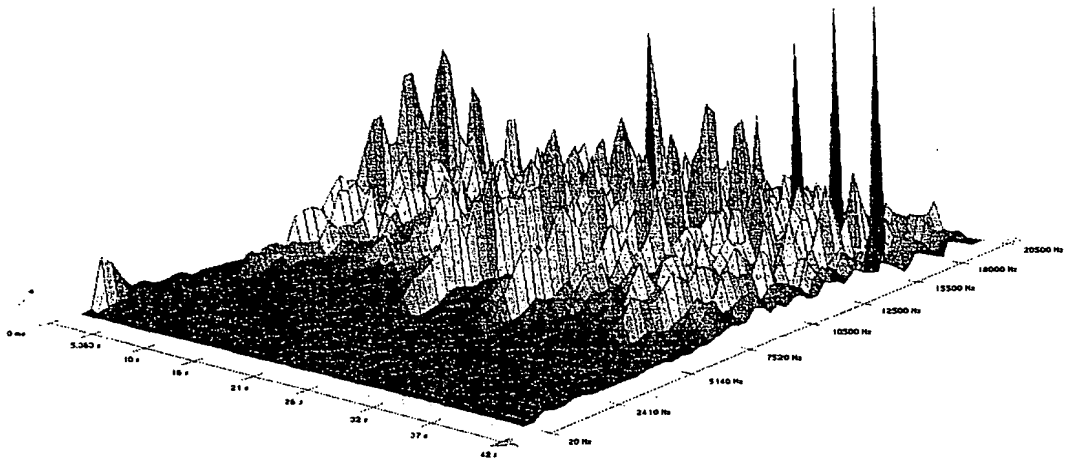


Figure 9.2.5: Three-dimensional spectrogram analysis of sferics activities on 5/2/2002 at 1 a.m. (recorded at Lido Estensi/Ravenna, Italy).
The corresponding meteorological situation can be described as follows: overcast, wet, imminent rain at the low-pressure ridge, warm sector (later sferics recording in accordance with **Figure 9.2.5**). People felt very tired, exhausted. Visible Omega signal components at the frequency 15 kHz with level-like broadband pulse discharges are evidence of the described low-pressure weather situation, including a warm sector (thunderstorms dissipated in the far field > 50 km). Indication of a rare 1-kHz-sferics shown at point in time of approx. 1 second.

The spectrogram in **Figure 9.2.5** shows 1-kHz sferics in addition to bursts with widely varying frequencies and times. Sferics at this frequency are extremely rare; in this case, they are the **main** frequency intensity component. These 1-kHz sferics presumably indicate atmospheric discharges generated very far away.
As a matter of principle, based on the sferics analyses the daily rhythm recognized by **[3, 41]** can also be verified. This rhythm is not shown in the statistical-temporal occurrence of atmospheric discharges with the main frequencies 10, 12 and 28 kHz (see **Figures 9.2.6, 9.2.7**).
Rather, in certain frequency ranges it appears as a broadband spectral maximum.

The tonal aspects mentioned above fit in with these patterns. An example is gurgling which can be heard only at night (nice weather; refer to **Chapters 9.3** and **9.6** for details). At night, the levels of the sferics was reduced (approx. 3 dB) and thunderstorms occurred on a daily basis around 8 p.m. These observations agree with the graphics of daily rhythms.

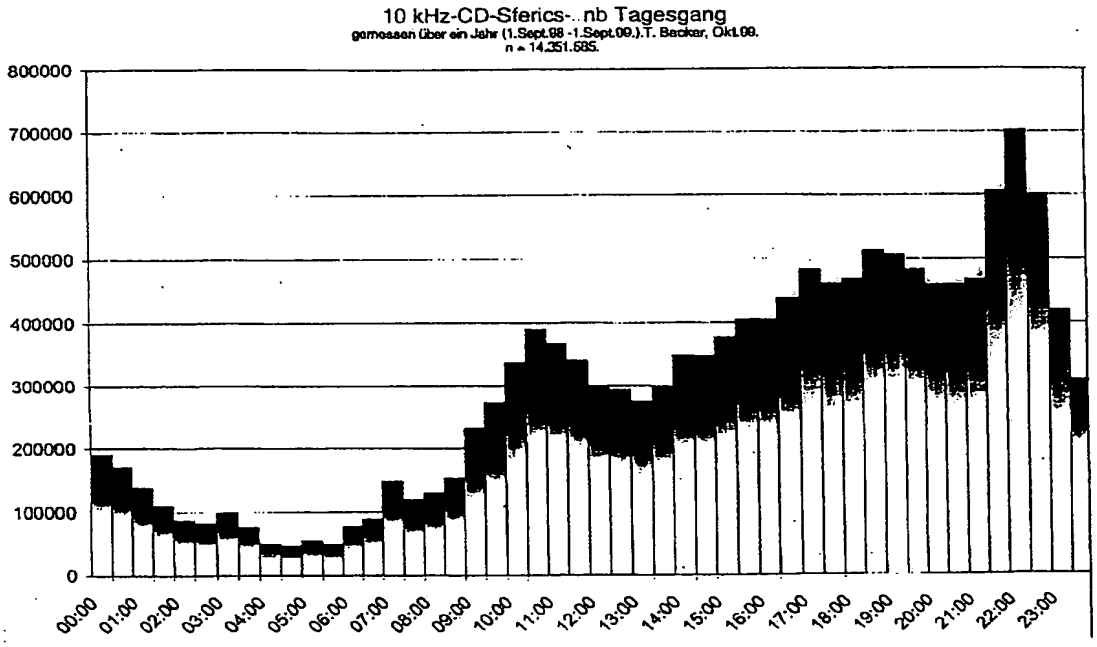


Figure 9.2.6: Statistical addition of the collected data on 10-kHz sferics activities around Munich, from 9/1/1998 – 9/1/1999; so-called daily rhythm shown as averaged data over a period of 24 hours (from **[41]**).

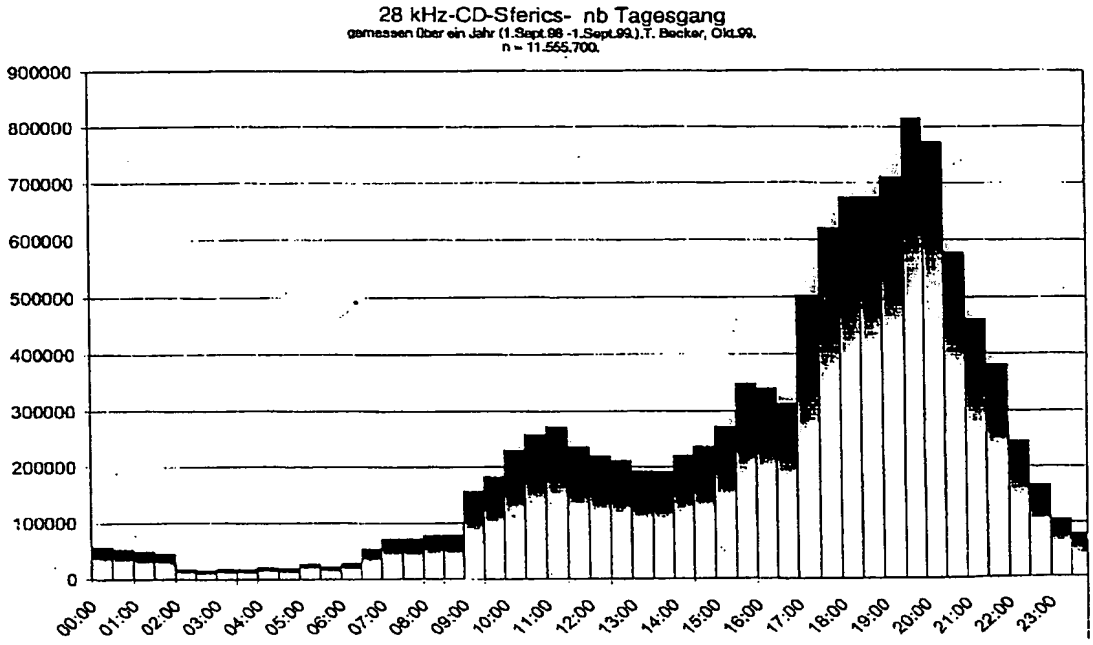


Figure 9.2.7: Statistical addition of the collected data on 28-kHz sferics activities around Munich, from 9/1/1998 – 9/1/1999; so-called daily rhythm shown as averaged data over a period of 24 hours (from **[41]**).

When this time-related vantage-point is extended to the entire year, the following result becomes clear. In winter, it would appear to be possible to record mean atmospheric discharge level values which are at least 10 dB lower. In further investigations starting in July, 2002, atmospheric signals were recorded not only in Central Europe but also in Tennessee, near Nashville. Additional recordings were made in August in southern Sweden (on the islands Gotland and Oeland).
In the U.S., the weather was variable and usually warm, like in Germany at the same time. There were only a few days of unspoiled sunshine in a row. Thunderstorms occurred almost every day (as well as rain showers; 20 - 50 liters/m²). The humidity there was around 95%; the temperature was about 5 to 8

degrees Celsius higher than in Bavaria. This monsoon-like weather picture was recorded over nearly five weeks.

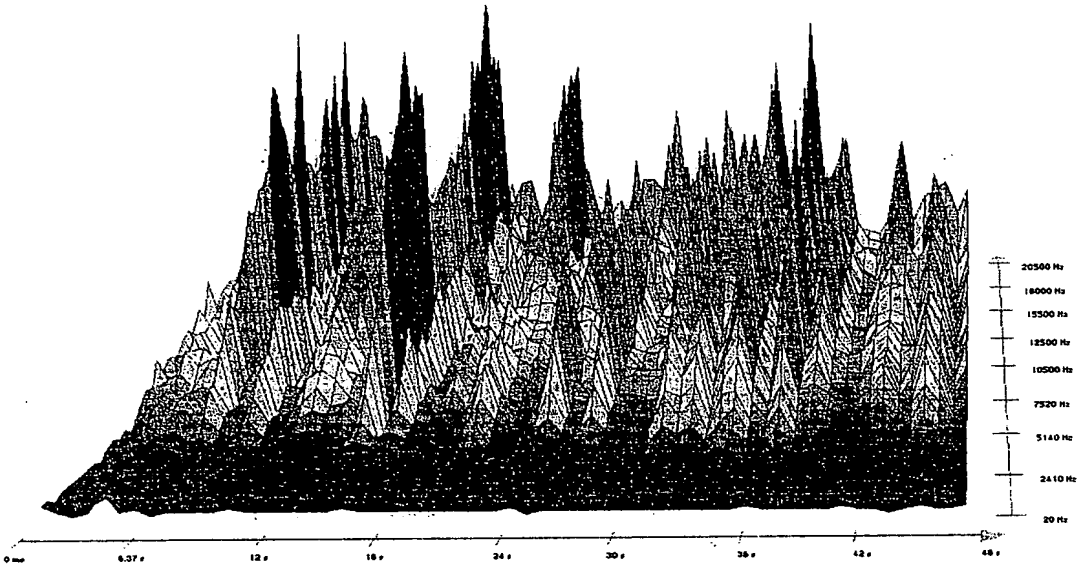


Figure 9.2.8: Three-dimensional spectrogram analysis of sferics activities on 7/17/2002 at 7 p.m. (recorded at the Washington, D.C., airport).
The corresponding meteorological situation can be described as follows: In the main high-pressure area no cloud cover and 33 degrees, dry and warm. It could not be determined how people felt, because people were not available for a survey. The near-field broadband bursts flowed with uniform signal dynamics, verifying the weather situation as experienced, without recognizable Omega signal components at the known frequencies of 12 to 15 kHz.

On both continents (almost simultaneously), it generated identical sferics formations in Germany and for four days in Nashville, Tennessee. (At the latter location, random samples were taken.) These formations can be seen, for example, in **Figure 9.2.8**. Apparently, they show that the sferics activities are similar all over the world, and are a function of the season. The structures of the sferics walls are the same, cf. **Figure 10.2.2**). The high summer temperatures (at least 20 to 30 degrees Celsius) seem to be involved in this sferics dominance. By comparison, no Omega signals can be recognized in **Figure 9.2.8**.

9.3. Sferics before and during thunderstorms; lightning

Numerous studies have adequately described the temporal and spectral characteristics of lightning [1, 37, 42]. Although the extreme, high-energy discharges have been well researched, with well-known pre- and post-discharges in so-called opening air-lightning channels, spectral characteristics should be discussed at this point.

Lightning bolts generate frequencies all the way from the ULF range to some Megahertz. This is the reason for generally known disturbances related to the so-called "pulling effect" in LW, KW and MW frequency ranges of broadcast transmission during certain atmospheric conditions.

The following observations concerning meteorosensitivity were made. A few hours before weather upheavals, human well-being is disturbed. People do not feel well. Shortly before it begins to rain, when thunderstorms approach (which had had an aggressive, stressful effect), the common feeling of bad temper changes to tiredness. At some point, the tension melts away and people feel relaxed. This indicates additional research is required on meteorosensitivity and the related spectral characteristics before, during and after thunderstorms.

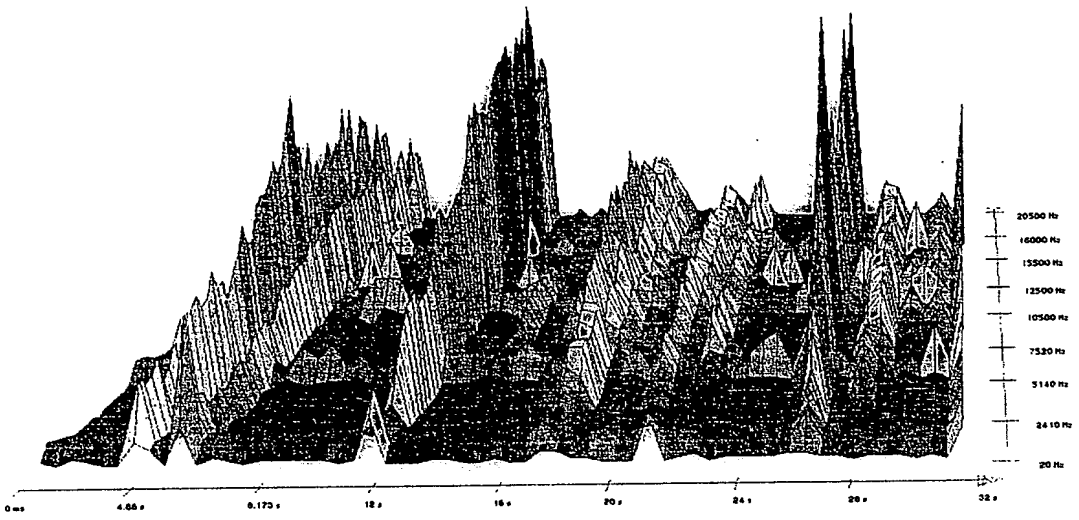


Figure 9.3.1: Three-dimensional spectrogram analysis of sferics activities on 5/27/2002 at 4 p.m. (recorded at Lido Estensi/Ravenna, Italy).
The corresponding meteorological situation can be described as follows: Some sun, however 60% overcast. There were already several thunderstorm cells in the far field, as indicated by the broadband sferics bursts for analysis times 4, 11, 17 and 26 seconds (thunderbolt discharges at a distance of around 30 to 60 km). In addition, weak Omega signal components could be displayed at 12.5 and 15 kHz. People were slightly irritable.

The following, repeatedly measured electromagnetic phenomena in the AIS spectral analyses can be reported as findings:

(a) When the weather is instable and "aggressive" (e.g. before the onset of a cold front), initially Omega technics dominate. In this case, walls of highly dynamic sferics discharges were noticeable over the time axis (see the above descriptions of meteorosensitivity and feeling "highly aggressive"; cf. **Figure 10.2.5**).

(b) While cumulus clouds are forming (to an altitude of over 10 km), the initial major broadband discharges occur. They can be heard as separate, strong crashing or crackling. The spectrum ranges from around 500 Hz to over 20 kHz, with the

intensity peaking at around 10 kHz (which according to BAUMER **[3]** is typical). The overall spectrum level rises to around 20 dB. Those Omega bursts which are specific to certain weather conditions (also technics at 16/18 kHz) gradually move to the background of the 3-D spectrograms (see **Figure 9.3.1**: small peaks).

(c) As the thunderstorm approaches or grows into the higher cloud icing zones (above 10 km), the overall recorded energy of the discharges increases. Within minutes, this can cause the levels of sferics activities to increase 20 to 60 dB. As this happens, the lower sferics limiting frequency drops below 100 Hz. At this moment in the existence of the thunderstorm, a mixture of lightning bolts with alternating level dominance is encountered. These lightning bolts have nonuniform bandwidths (lower limiting frequency). Over frequency, the broadband spectrum of the wall-like sferics bursts has approximately or predominantly the same intensity (some bursts have a slightly "hunchback" shape).

(d) If the thunderstorm is fully active, less than some km away, or directly overhead, then the lightning bolts become increasingly frequent and intensive. The recorder had to be switched to maximum **In**sensitivity. As a matter of principle, the connection cable sufficed entirely as a reception antenna. As is well known, in these thunderstorm moments electric fields of some hundred thousand volts and more are built up. Interestingly, before each lightning discharge equipment for measuring static electrical fields picks up an electrical "D.C. field" which steadily increases and decreases for some seconds. This is actually a ULF alternating field with an increasing edge of around 5 seconds. The level rises to a multiple of the initial value and then drops (or vice versa; increase and decrease swapped), until a vertical or horizontal lightning bolt occurs.

(e) When lightning strikes at distances of less than 1 km, the lightning spectrum shows a maximum at frequencies under 20 (presumably in the millihertz range).

The curves of the lightning walls have edges shaped like ski-jump hills. They have their highest intensity at low frequencies (see **Figure 9.3.2**). Each lightning bolt has these sharp mountain ridges curves and edges. They are similar to those of the 3-D spectrogram for a 10-Hz periodical magnetic field, such as in **Figure 9.3.3.**

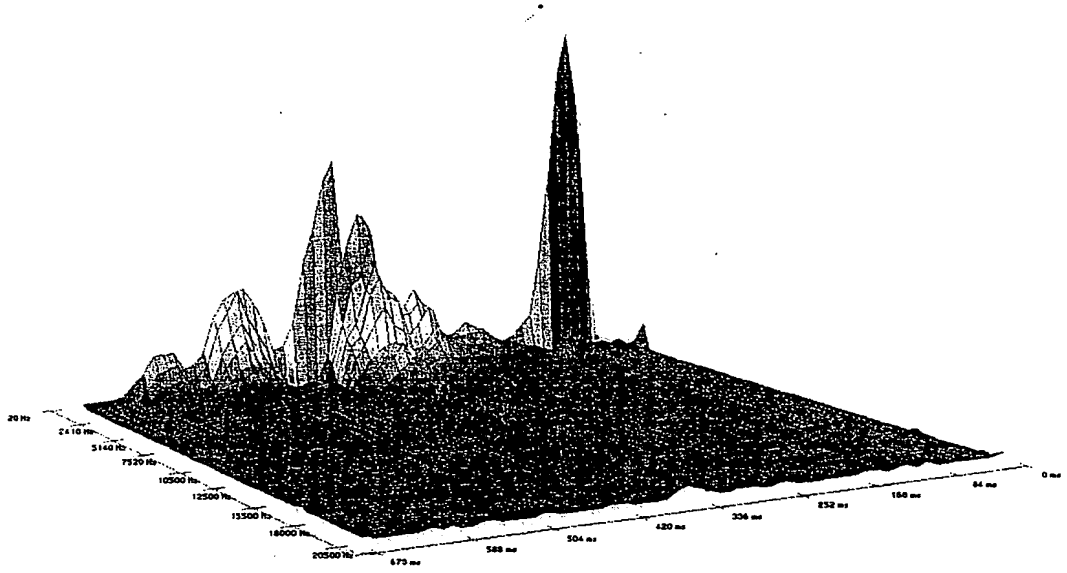


Figure 9.3.2: Three-dimensional spectrogram analysis of sferics activities on 5/27/2002 at 6 p.m. (recorded at Lido Estensi/Ravenna, Italy).
The corresponding meteorological situation can be described as follows: directly approaching thunderstorm, which continued to form locally. Rain began to fall. Thunderbolts at a distance of a few hundred meters and at a distance of around 2 km to the measurement point (t = 100 ms as well as 350 ms). Measurement sensitivity was reduced minus 80 dB (voltage reference to other measurements). The noteworthy aspect of the lightning (single and multiple bolts, lasting some 10 milliseconds) was conspicuous main energy components in a low-frequency range below 30 Hz; the broadband spectrum extended to 20 kHz. People felt agitated. As is generally known, this behavior pattern is typical for people and animals before and during thunderstorms.

These descriptions are suitable for proving that noticeable, increasing physical and psychic unwellness some hours before thunderstorms arises with broadband AIS whose levels vary greatly. This unwellness is visible in conjunction with the presence of Omega bursts. (With regard to AIS with specific spectrum level peaks, see 10 kHz as per **[3]**). Shortly before the thunderstorm and in it, these spectral characteristics change to increasingly intensive, more **broadband** discharges of the more dominant sferics.

The main intensity of the lightning spectra lies in the ULF/ELF/VLF range. All of the available knowledge on the subject points to this as being the cause for a bodily relaxation phase. This sometimes even leads to tiredness. (This regenerates the strained body functions.) Apparently, high-energy, **broadband** lightning bolts have a biotropically **neutralizing** effect on highly dynamic weather burst discharges and the electromagnetic fields of broadcast and mobile radio transmitters.

This is based on the above-mentioned studies done in the U.S. with various, discrete signal frequency effects **[7, 23]**. Within a very brief time, these effects were able to artificially generate the effect of "being under the weather", for example. At the end of the year 2001, these principles concerning frequencies and their possible effects in conjunction with alternating fields were applied by the radio station r.s.2 in Berlin. (This was described above in **Chapter 3**.) The station embedded a so-called "happiness frequency drug" (mixed from a signal modulation product of audio signals at 13.5 and 14.5 kHz) into the stereo signal, at minus 35 dB. Hence, this "drug" was included in the transmission and sent to many destinations **([44]; see Figure 3.1, 3.2)**. Unfortunately, the local effects of this "drug" are unknown.

In any case, such sferics frequency components have been recorded during thunderstorms (a link to further information can be found in **Chapter 9.6.**).

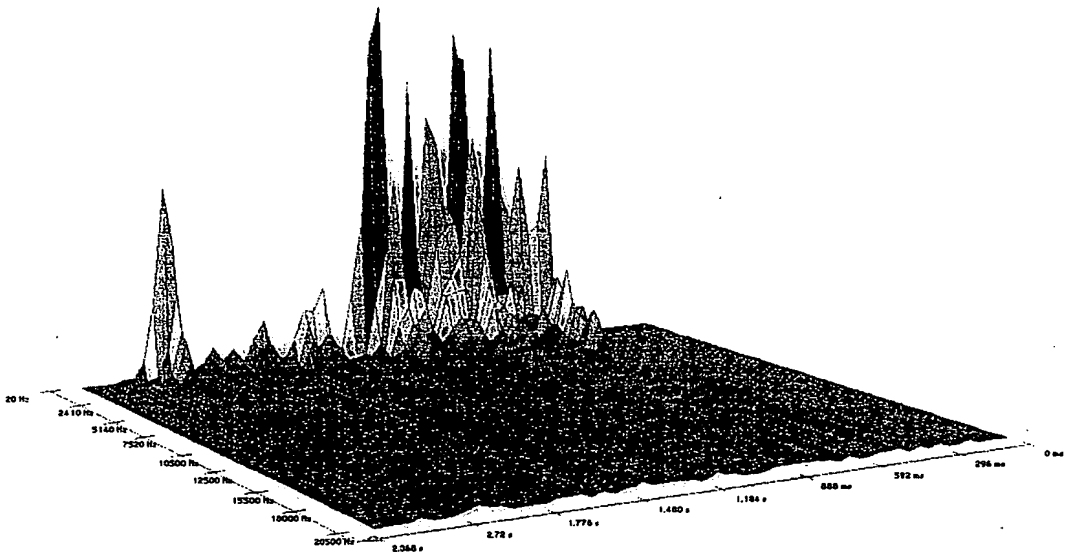


Figure 9.3.3: Three-dimensional spectrogram analysis of sferics activities on 5/27/2002 at 6 p.m. (recorded at Lido Estensi/Ravenna, Italy) during a corresponding meteorological situation in accordance with **Figure 9.3.2.** The figure provides an analysis of a fully active thunderstorm. Multiple bolts of lightning struck at a distance of a few hundred meters to the measurement point. The broadband spectrum extended to 20 kHz. However, here as well, the relatively weak Omega signal components and the sferics activities were outside of the visible dynamic range.

9.4. Technics or synthetic electromagnetic alternating signals

This chapter will site several exemplary situations involving evident electromagnetic fields in the areas of households, offices and industry, in order to compare such fields with sferics activities. No attempt will be made to be exhaustive. It will be assumed that these synthetically generated alternating fields can be clearly recognized as different than the natural field spectrum composition. First, an overview will be provided of alternating fields ranging from low VLF frequencies to the ELF/VLF range (audio signal carriers in accordance with Chapter 10.2.):

I. Regarding ELIVIT MOBIL; therapeutically effective 10-Hz broadband burst for enhancing one's ability to concentrate, synthetically generated with semiconductor electronics (**[6]** and **Figure 10.2.8; [21]**). Outstanding characteristics are the temporally rhythmic bursts, with evenly decaying spectral intensity. Compared with the 3-D spectra of lightning mentioned in the previous chapter, the edges are conspicuously wider and longer. The leading edge of lightning bolts is broader and shallow. Hence, nature requires more energy to transfer biotropical thunderstorm information (up to some million volts are possible during thunderbolts). However, the thunderbolts do not repeat periodically, but rather according to a temporal stochastic pattern. Additionally, in the lightning's near field, the above-mentioned components of the spectral harmonics lose intensity faster than the 10-Hz therapy burst. This could be the reason for the difference in the physical/psychological reactions of people between these field situations (see later in Chapter 10.2.).

II. A sferics measurement made at a distance of 30 m to the elevated tracks of the German Federal Railway in the downtown area of the city Bochum (16 $^{2}/_{3}$ Hz, 3/4/2002) having primarily technics components **(see Figure 10.2.9)**. An initial, visual analysis revealed conspicuous audio signals across the time axis, including the related, also continuous harmonics. For these technics, that means a kind of permanent tone whose level varies (periodically) or rather continuously present frequency position information, for each harmonic spectrum maximum. At this point, the following question will remain unanswered: Is there a window of biologically effective frequencies in this signal main frequency range or at the peaks ranging to around 3 kHz? Almost in the background, typical Omega or sferics activities can be discovered above 10 kHz (variable weather). Based on the decades of academic research by LUDWIG **[21]**, this can be interpreted as a frequency range of magnetic field therapy (such as the device "MEDISENT") which lies outside the range of frequencies which have a positive treatment effect: The stepped burst frequency settings range from 1.4 Hz to 12.2 Hz. Their effect can be described as calming, relaxing, regenerating, etc.
However, frequencies starting at 24.2 Hz and 32.4 Hz promote a feeling of fitness. They counteract fatigue or tiredness, and thus have a stimulating effect. These stepped burst frequency settings are used in magnetic field therapy devices. In contrast with a common belief, the low-frequency magnetic fields of the elevated tracks produce a kind of permanent simulation. It becomes an overdosis of technics, like the effect of a near field (stress factor).

III. On 3/26/02, right next to a <u>television and radio tower</u> an electromagnetic mixture of various television, radio, service radio and mobile radio signals was recorded in Götzenhain, Germany **(see Figure 10.2.10)**. In addition to some technics peaks, a demodulated harmonics product was measured with main

intensities at the frequencies around 1,000, 5,000, 10,000 and 18,000 Hz. The recorded sferics activities were heavily masked, with weak peak levels as shown in **Figure 10.2.10** at 15 kHz. I.e., in this case the encountered horizontal sferics signals were lower than the above-mentioned synthetic fields by a mean factor of > 10. At that time, the weather was overcast and variable.

These electromagnetic, atmospheric ELF/VLF circumstances could be measured repeatedly all over the world (such as in Nashville, Tennessee, in July, 2002). 50- or 60-Hz line voltage hum was heard at random, conducting objects such as trees and street signs. Radio signals could be picked up easily by direct taps, without a radio demodulator (the DAT recorder and line/microphone input were described in **Chapter 6.1**).

IV. The recording shows a mixture of measured, demodulated low-frequency field components of an active GSM mobile radio mast plus a DECT telephone in the near field of the latter's field source (at a distance of some meters). This mixture was acoustically tapped off of a speaker. This was accomplished by placing the above-mentioned measurement equipment ("Digimeter" **[40]**) in office rooms shielded by the usual windows and walls. For this reason, no sferics activities are apparent **(see Figure 10.2.11)**. The dense GSM time spectrum is typical, with a proportional Gauss envelope chiefly at 217 Hz.

V. A PC monitor is part of modern equipment for ergonomic working conditions.

The field radiation of such monitors (including radiation) was measured at a distance of a few centimeters from the device, using a freely suspended piece of wire (1 m long). The wire was directly connected with the microphone input jack (reduced recording sensitivity) in the mentioned DAT recorder **(see Figure 10.2.12)**. At this point, the field intensity (which decreases exponentially) will not

be discussed in detail. The essential aspect appears to be the harmonic content, which can be analyzed in three dimensions. This content extends far into the kHz frequency range.

Here, too, the unresolved issue is whether these frequency components have biological effects caused by natural (nonionizing) low-frequency radiation, especially since this work recorded sferics specifically starting at 1 kHz.

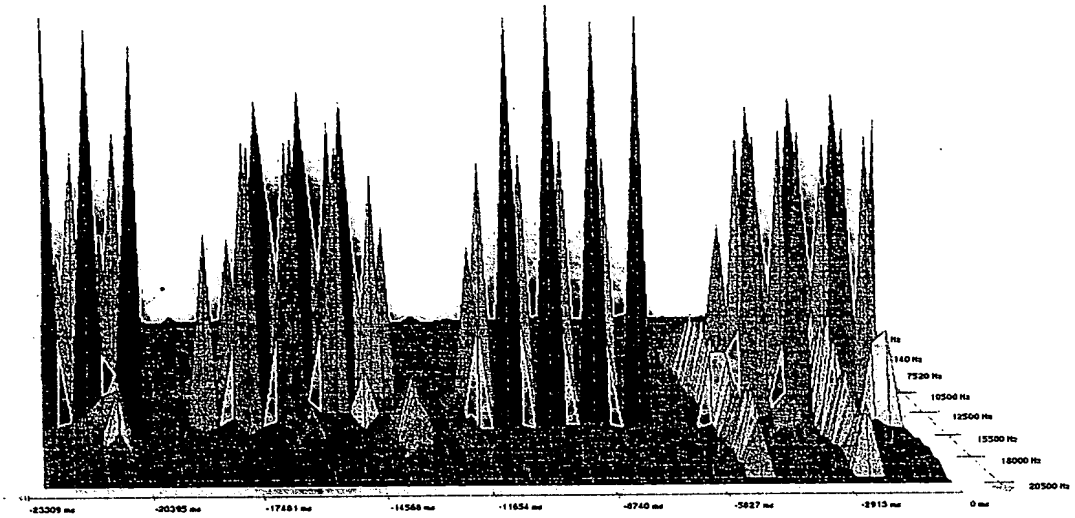


Figure 9.5.1.1: Three-dimensional spectrogram analysis of sferics activities on 3/25/2002 at 10 a.m. (recorded at Iffeldorf/Upper Bavaria) with the following meteorological situation.
A cold front had passed through. In all of Bavaria, there was 3 - 5 cm of snow cover, the temperature was -1 degrees; the sun shone. Cloud cover alternated from 0 to 30% cumulus cloud cover. The way people felt could be described as neutral. A low-pressure system was located nearby. It was verified in the dominant15-kHz Omega signal components. In addition, the mentioned exchange of air masses was verified in the Omega signals at 12/12.5 kHz. Intermediate high-pressure influences in accordance with the weak broadband pulse discharges could also be observed. When the graphic is shown with the frequency axis inverted, however, three complete drop-outs of sferics spectral amplitude can be seen for display times of around 6.5/13/19.5 seconds (compare with technics abnormalities related to the earthquake in "Afghanistan").

9.5. Predicting earthquakes on the basis of detected sferics anomalies in the ULF frequency range

9.5.1. The discovery of the phenomenon – possible causes

For the sferics recordings, various resolutions were selected for 3-D spectrogram analysis. Sferics spectra were examined empirically with various time scales. In the evening of 3/25/2002, a rare, periodical pattern was discovered in the 3-D spectrogram for a morning measurement in accordance with **Figure 9.5.1.1**: For some ten milliseconds, approximately every seven seconds (repeatedly) almost no sferics bursts could be seen in the graphic. The situation will be reviewed to improve understanding the context:

On the day of the recording (3/25/2002, shortly after 10:00 a.m.), a cold front had passed through the area, with temperatures just below 0 degrees Celsius. Sunshine alternated with cloud cover. The recording was made in the city of Iffeldorf in Upper Bavaria; see **Chapter 9.1**. Initially, it was assumed that the measurement equipment was defective or that a measurement error had been made. The equipment was checked and found to be functioning properly. In a later discussion **[44, 45]**, terrestrial effects were considered, possibly coming from the ground. This lead to the following question: "What could have caused these spectrogram level troughs?" If Bavaria were not located in a geographically quiet area, where earthquakes are rare, something should have been picked up during and after the morning recording.

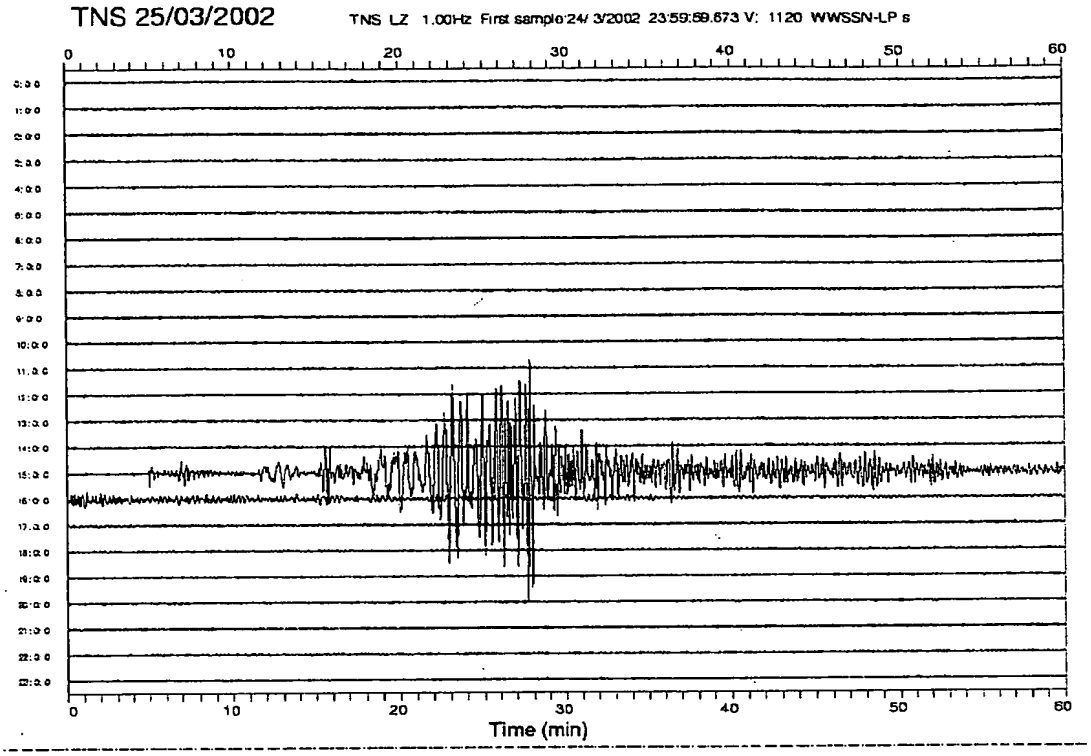


Figure 9.5.1.2: The seismogram for Figure **9.5.1.1** indicates earthquake oscillations in Afghanistan on 3/25/2002, starting around 3.00 p.m.
(measured in the Taunus observatory near Frankfurt, Germany; from **[45]**).

In the morning of the next day, 3/26/2002, these considerations were verified by an unexpected source. At 8:30 a.m., the Bavarian radio station "B5 aktuell" reported that a violent earthquake had occurred the previous day in Afghanistan (see **Figure 9.5.1.2**; seismic strength 6.8 on the common Richter scale), which was surprizing. This resulted in the following unanswerable questions and contexts: How it is possible for an extremely low-frequency oscillation at a frequency of less than 1 Hz (1/7 sec = f = 0.14 Hz in the ULF range) to occur **before** an earthquake (movement of the **ferruginous** ground), i.e. "in the **future**"? How it is possible for

this ULF oscillation to modulate into the atmosphere, at a distance of around 6,000 km, resulting an a reduction or variation in the intensity of the sferics activities, which otherwise are visible, with uniform levels?

- During the following days, there were several aftershocks, which were clearly identified with the sferics analyses of 3/27 and 3/28/2002.
- Had such periodical erasures been recorded earlier (in a different way)? Or had such erasures been overlooked because the resolution of the spectrograms' time scale was not fine enough?

The fundamental question is how can oscillations be picked up caused by an event that has not even yet occurred? Initially, the cause-and-effect relationship could not be shown. During the week in question, Internet searches located documents on typical ULF frequencies of mechanical ground oscillations between 1 and 1/30 Hz, specifically 0.1 Hz **[46]**.

For a further search, the term "earthquake prediction" was entered. The results verified the above assumptions directly. In particular, an "Earthquake Report" with published publication summaries was found. It had been presented during a listed workshop of **NASDA 2001** in Japan **[47]**. A large body of international research in the field of predicting earthquakes corroborates the existence of electromagnetic field fluctuations at ULF frequencies from some millihertz to the Megahertz range, beginning some days **before** an earthquake.

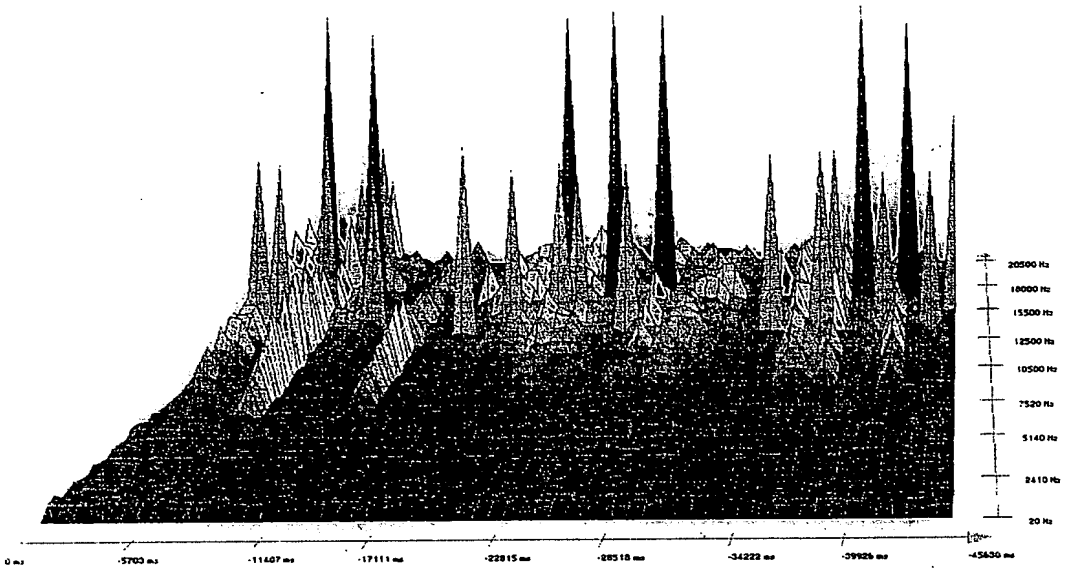


Figure 9.5.1.3: Three-dimensional spectrogram analysis of sferics activities on 4/6/2002 at 3.00 p.m. (recorded at Alling/Upper Bavaria) with the following meteorological situation.
Slight high-pressure area, cloudless, east wind, 6 degrees. The way people felt could be described as neutral. There was a remote low-pressure system, as indicated by the dominant 15-kHz Omega signal components. However, two sferics spectral amplitude reductions are also apparent for the display times of around 17/31 seconds (compare with technics abnormalities in "Chile").

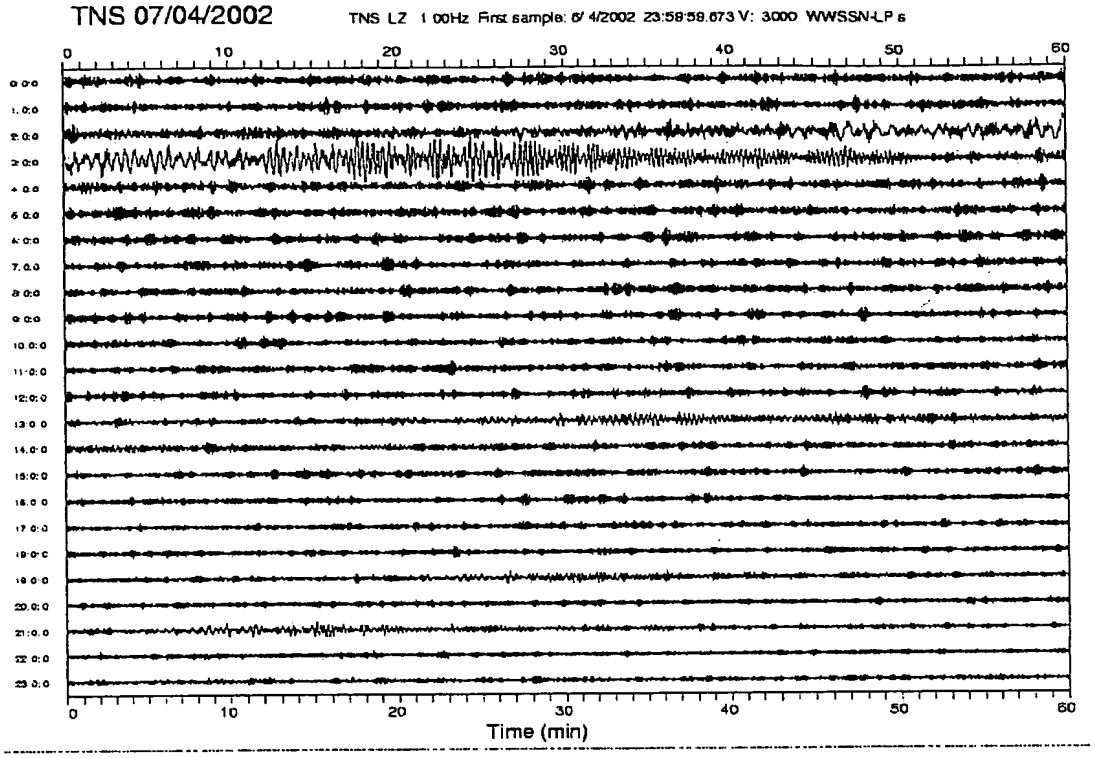


Figure 9.5.1.4: The seismogram for **Figure 9.5.1.3** indicates earthquake oscillations in Chile on 4/7/2002 starting around 2.50 a.m. (measured in the Taunus observatory; from **[45]**).

The ULF alternating fields indicated in some studies apparently could be recorded as close as 100 km to the epicenter. The reason is that the related antennas and coils were probably erected with horizontal orientation (among others) for electrical/magnetic fields. Thus, in an earthquake's near field these magnetic field abnormalities apparently propagate mostly vertically; the farther the observation point is removed from the epicenter, the abnormalities propagate horizontally. I.e., directly over epicenters (perhaps also eruption points; cf. volcanic eruptions) a minimum of magnetic field abnormalities can be expected when measuring

magnetic fields horizontally. These 3-D spectral troughs seemingly occur in the modulation product consisting of sferics, technics and ULF abnormalities.
This agrees with numerous observations of people at the sites of earthquakes, including before an eruption. Animals run around randomly; people's hair stands on end; the frequencies of television and radio stations is not stabile, etc. **[47, 48, 49]**.
Subsequently, several significant earthquakes (with reported strengths between 6 and 7) were measured; their sferics were recorded and analyzed. This included:

- Taiwan on 3/31/2002 (distance: 10,500 km, period of abnormalities: around 12 sec),
- Chile on 4/6/02 with partly cloudy nice weather (intermediate high-pressure area) in accordance with **Figure 9.5.1.3** as well as a seismogram in accordance with **Figure 9.5.1.4** (distance around 12,000 km; period of abnormalities: around 14 sec),
- especially conspicuous was a violent earthquake on 4/25 and 4/26/02 in the Russian republic of Georgia (Tiflis; a distance of around 2,800 km) in accordance with **Figures 9.5.1.5, 9.5.1.5a, 9.5.1.5b** (three figures which demonstrate the existence of the abnormality some days before the earthquake itself, starting on 4/19/02. With regard to the abnormalities, refer to the low AIS levels in the three **figures** with a period of $t < 3$ sec. A report of the radio station B5aktuell/Bavaria on the morning of 4/26/02 confirmed this night-time earthquake and
- earthquakes including one that occurred on 7/31/02 at 4:48 p.m. in the American Costa Rica region. In a 3-D sferics analysis (see **Figure 9.5.1.6**), it is seen as a periodically reduced sferics burst intensity behavior lasting around 11.5 seconds. The recording was made at around 10:00 a.m. in Iffeldorf/Upper Bavaria during cirrus cloud cover, sunshine and eight hours before strong thunderstorms.

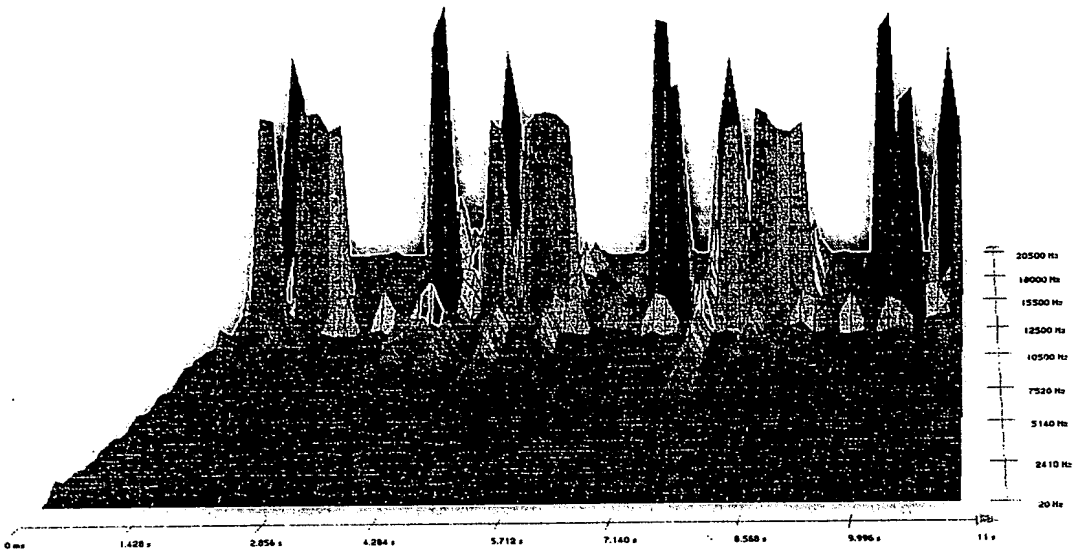


Figure 9.5.1.5: Three-dimensional spectrogram analysis of sferics activities on 4/25/2002 at 10 p.m. (recorded at Iffeldorf/Upper Bavaria) with the following meteorological situation.
Low pressure, drizzle, 10 degrees. People felt tired and somewhat irritable. The local low-pressure system in the warm-air sector was shown in the dominant 15-kHz and somewhat weaker 12/12.5 kHz Omega signal components (in particular, numerous relatively weak Omega signals at 12 kHz). However, three sferics spectral amplitude reductions are also apparent for the display times of around 3/6/9 seconds (compare with technics abnormalities in "Tiflis").

It is currently not possible to describe with adequate atmospheric models how these ULF abnormalities arise **[46]**. Possible global causes for the graphically demonstrated, magnetic alternating field reactions of the earth (including its air layers) in the ULF range include:

- increased "potential tensions" in the ferruginous ground (pressure/tension potential fall inside the earth) as well as

- mutual or bilateral reactions of the ionosphere (due to the shifting of various continental plates, among other factors).

In the current context, this hypothesis is based on:

- above-mentioned observations of the ionosphere, with satellite-supported laser sampling in accordance with **[46, 47, 48]** and
- the geophysical model description of given, whistler-like sferics activities at night, with pitch patterns which fall over some milliseconds to seconds (see **Chapter 5** and **[37]**).

Hence further study is required, in order to create models based on these explanation attempts.

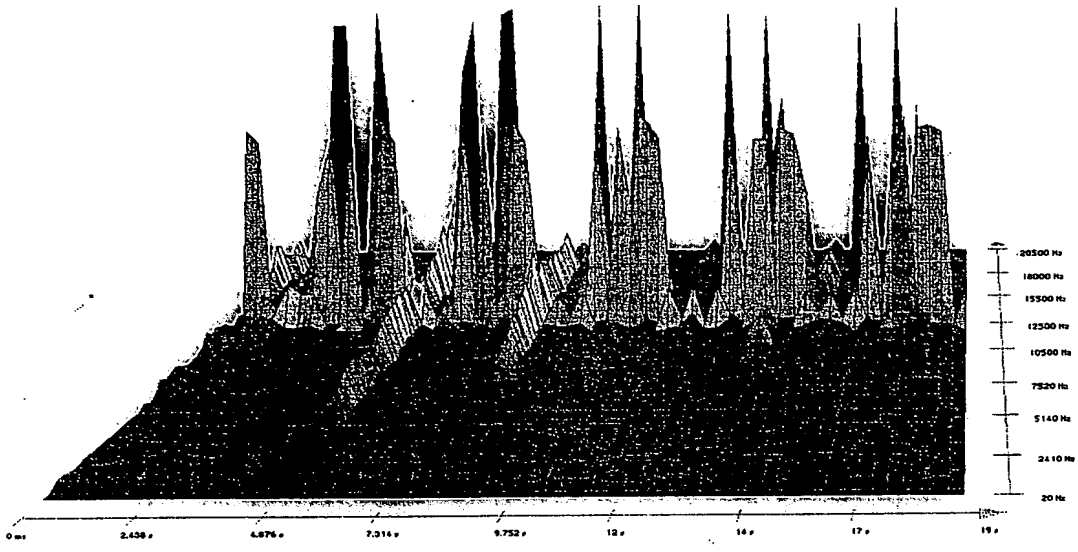


Figure 9.5.1.5a: Three-dimensional spectrogram analysis of sferics activities on 4/22/2002 (recorded at Iffeldorf/Upper Bavaria) with the following meteorological situation.
Begin of low pressure, foggy. People felt tired. For detailed descriptions, refer to **Figure 9.5.1.5**. Three days before the earthquake, conspicuous technics/sferics spectral amplitude reductions were noticeable in the time display (compare with periodical technics abnormalities regarding the Tiflis earthquake).

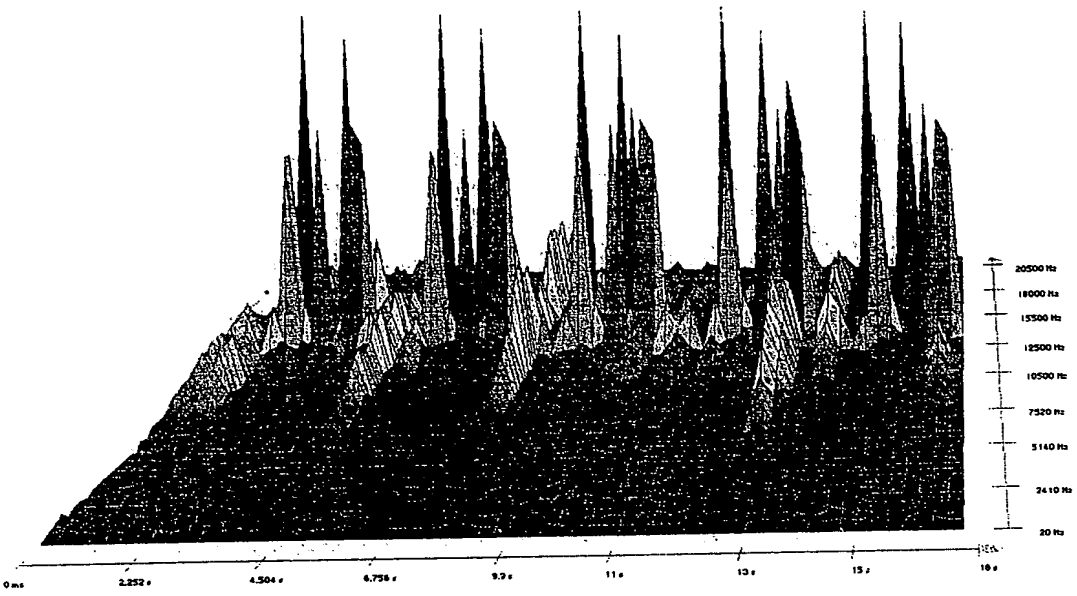


Figure 9.5.1.5b: Three-dimensional spectrogram analysis of sferics activities on 4/23/2002 (recorded at Iffeldorf/Upper Bavaria) with the following meteorological situation.
Low pressure, sunny for a short period of time, imminent rain showers. People felt tired. For detailed descriptions, refer to **Figure 9.5.1.5**. Two days before the earthquake, conspicuous technics/sferics spectral amplitude reductions were noticeable in the time display (compare with periodical technics abnormalities regarding the Tiflis earthquake).

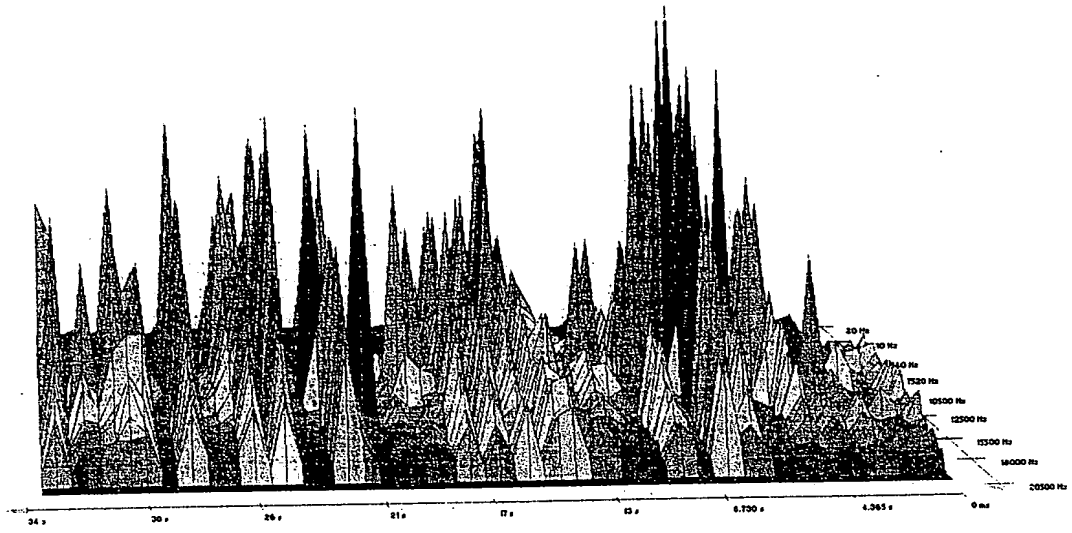


Figure 9.5.1.6: Three-dimensional spectrogram analysis of sferics activities on 7/31/2002 at 10 a.m. (recorded at Iffeldorf/Upper Bavaria) with the following meteorological situation.
Instable high-pressure area, with cirrus cloud cover (8 hours before a thunderstorm), 22 degrees. People felt irritable. There was a low-pressure system in the distance, as indicated by the 15-kHz Omega signal components. Masked Omega signals at 12.5 kHz behind the conspicuous broadband burst discharge walls are evidence of the mentioned instability. In addition, powerful discharges occurred even in the morning (time = 8 seconds), pointing to a later thunderstorm. Also, three technics/sferics spectral amplitude reductions can be seen for display times of around 1/13/24 seconds (compare with sferics/technics abnormalities in "Costa Rica").

9.5.2. Modeling the ULF abnormalities contained in AIS

The possible consequences of this extraordinary data (in accordance with **Figures 9.5.1.1/3/5/6)** will be shown, based on the following model-like process description: Taking all of the above related parameters of the five major earthquakes in the form of "abnormality periods = T" and "epicenter distances = D to the measurement location " in Upper Bavaria, then a linear function can be interpolated from the five entered points. This linear function intersects nearly at the origin of the coordinates:

$D = a*t + b$; $a = 0.86$; $b \sim 0.1$ to 0.2 (unit = kilometers).

This results in the following simplified equation when b is set to 0, which is probable for the far field of the epicenter (a distance of some thousand kilometers):

$D = 0.86*T$

For the near field, graphical sferics data is not available. Based on **[46]**, the function is assumed to be either an exponential function down to the origin for the epicenter (the intersection of axes in **Figure 9.5.2.1**) or a linear function, especially since the constant $b \sim 0.1$ to 0.2 agrees with the data found in the Internet on the non measurability of ULF magnetic fields, in accordance with **[46]**.
On the other hand, this data leads to another assumption: As the measurement point theoretically approaches the epicenter, the time of the abnormality's occurrence is reduced; and the related frequency increases. This would also

correlate with the broadband (low- and high-frequency) effects or abnormalities mentioned by (for instance) the NASDA report **[46, 49]**.

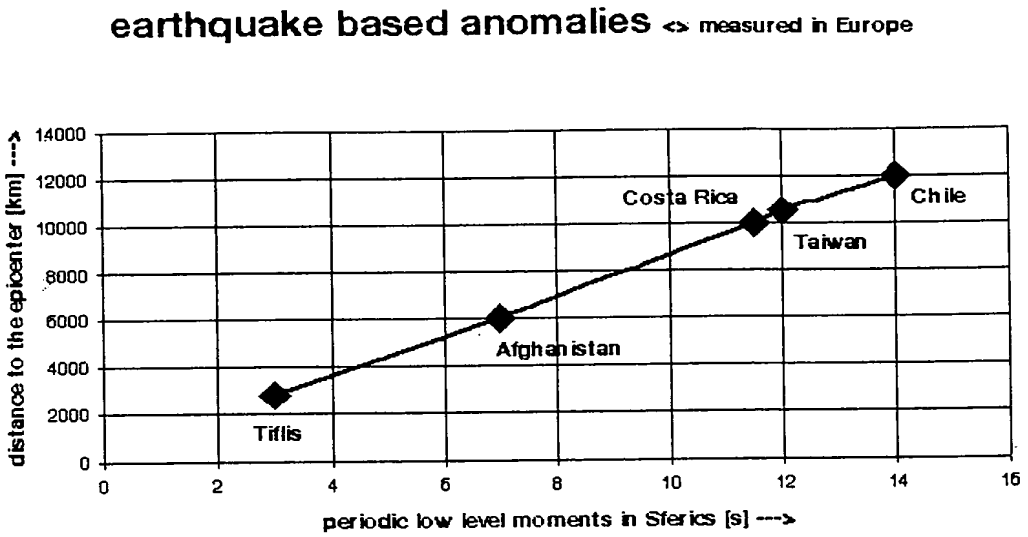


Figure 9.5.2.1: Summary of the technics/sferics abnormalities in the 3-D spectrogram analyses, integrated in a methematical model for future calculations of the epicenters.
The periodical spectral troughs (in the ULF frequency range) is equivalent to the drop-out period. These abnormalities correspond to the five major earthquakes which have been picked up to date. The distance of the earthquake's epicenter to the measurement site in Upper Bavaria was calculated retroactively and shown here. A linear function was derived from the five data pairs for the earthquakes, in accordance with **Chapter 9.5.1**. The **Appendix** deals with correlations between earthquake events starting in the fall of 2002 and further abnormalities which support the graphic and data shown here.

As a result, the **distance to an imminent earthquake** can be calculated practically as follows: If periodical abnormalities can be seen in the sferics activities, then the period of the abnormalities can be taken from the 3-D spectrograms. The related time value is then entered in the above equation, function or graphic. The distance to the imminent earthquake can then be calculated directly.

The easiest way to do this is by using a compass (calculated distance) and atlas (or a computer-supported technique would be more precise). This can then be optimized using software support based on the above linear function D = 0.86*T. In some cases, the function and the constants might have to be adapted to future data collections.

Unfortunately, the direction of an earthquake cannot be determined with a measurement station which measures only horizontal sferics activities from all four directions. Hence, either of the following would be required:

- several vertically oriented sector antennas and/or
- several sferics measurement stations. They should be set up all over the world, at distances of several thousand kilometers. Then, an intersection can be made based on at least two or preferably three range circles (radius from the above value "D"). Based on the two or three measurement stations/measurement distances, this intersection then results in a tangent or intersection of the circles. On a global scale, this would be equivalent to the position of the expected epicenter.

With the present models, it is not possible to state the propagation direction of the magnetic fields (via the surface, or the direct direction via the interior of the earth). However, an approximately direct propagation path of the magnetic field would appear to be more plausible from an electrophysical viewpoint (cf. "generation of whistlers on the bent magnetic field lines of the earth"; **[37]**, see **Figure 5.1**). Further, it is assumed that reflected or bent (attenuated) or delayed trails of the earthquake abnormality waves take the shortest path around or through the earth and the cosmos, with varying propagation resistances.

Earthquakes have been located before their occurrence using one mobile measurement and recording station (described in **Chapter 6**) located in Bavaria. In the 3-D spectrograms of these sferics recordings, various, seemingly superimposed artifacts (time windows with minimal sferics peaks) were noted which cannot be used to locate the epicenters (for example, retrospectively).

Figure 9.5.2.2 illustrates such a case (recorded on 7/2/2002), which apparently includes an addition of several reconstructed global earthquake activities (thereafter) am 7/2/02 in Columbia and Argentina as well as other places, and on 7/3/02 in New Guinea. The strength of these earthquakes was between 5.5 and 6.2 (approx. 30 km within the earth's mantel), so they were roughly equivalent.

The moments in time of the sferics troughs could be determined. In the spectrogram of **Figure 9.5.2.2**, they were determined to be 3.1/3.6/4.4 sec after one another. It is assumed here that data is not being falsely "interpreted", since multiple earthquake activities were detected, and especially since the distances to the epicenters (9,500/12,000/15,000 km, on 7/2 and 7/3/02) can be calculated by adding the approximate partial distances. (Based on **Figure 9.5.2.1**, these partial distances can be calculated from the above-mentioned times.)

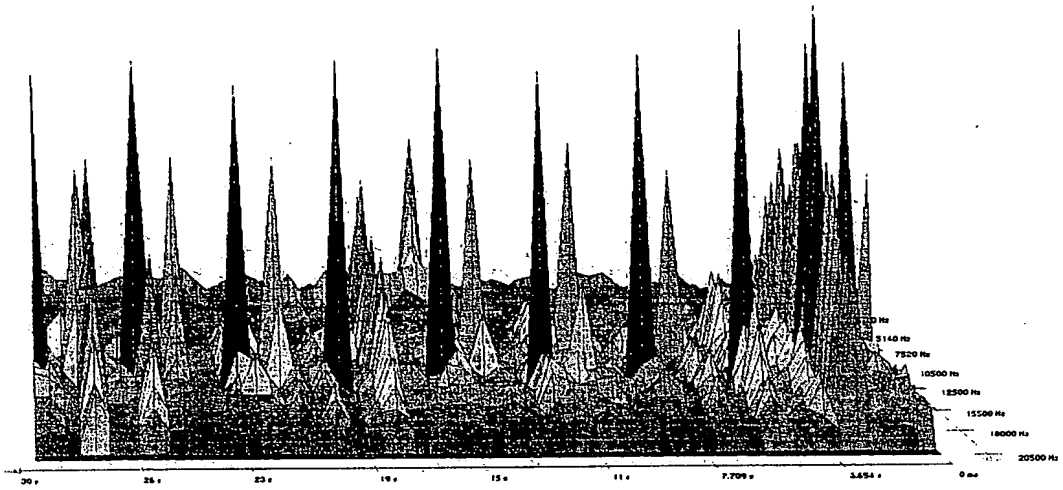


Figure 9.5.2.2: Three-dimensional spectrogram analysis of sferics activities on 7/2/2002 at 10 a.m. (recorded at Iffeldorf/Upper Bavaria) with the following meteorological situation.
Overcast, humid and warm, 20 degrees, imminent rain showers and later thunderstorms far away. People felt leaden, irritable. A small low-pressure system was located nearby, as indicated by the dominant 15-kHz Omega signal components. The 12-kHz Omega signal components point to a warm-air sector. Additionally, conspicuous broadband burst discharges are indicative of forming thunderstorm latency (t = 3/18/28 seconds). However, numerous superimposed technics/sferics spectral amplitude reductions were also noticeable for the times t = 2/6/9/13/17/21 seconds (sferics abnormalities are a sign of various expected earthquakes in the southern hemisphere).

In the discussion of these events, a further hypothesis was been made. It maintains that it is not merely the case that with increasing distance the artifact time of the sferics troughs in the 3-D spectrograms increases. Additionally, as the expected earthquake strength increases, the troughs become deeper or more apparent in the spectrograms.

As an alternative, these envelope-like effects can also be detected in the curves of the Omega signal peaks (sinusoidally varying maximum levels).

The magnetic ULF field effects are caused by world-wide tensions in the earth's crust. Hence, the intensity and frequency or wavelength of these effects are added or superimposed. This process takes place, for example, in those sferics recorded and measured at some time X, beginning at a distance of some hundred thousand kilometers.

To date, it has not been possible to detect such sferics level abnormalities during formation of thunderstorms (broadband discharges). It was difficult to detect these abnormalities (which currently can only be recognized optically) during a lengthy, monsoon-like weather situation in Central Europe. It occurred between the second half of June and the end of July, only broadband sferics could be detected (during rain, thunderstorms, nice weather).

Hence, relatively weak technics or Omega signal sequences disappeared from the 3-D spectrograms which were made. In the linear-scale display, they were hidden or made invisible by the relatively strong sferics discharges. At that time, apparently abnormalities could not be detected via the existence of technics. It reasonable to assume that these abnormalities (their quantity and hence their ULF frequency) are concentrated near imminent earthquakes **[46, 47, 48, 49]**. In addition, the troughs are then probably more pronounced. In such cases, these troughs can influence high-energy sferics bursts by modulating them or affecting

their envelopes to a greater degree. Further, it cannot be ruled out that the ULF effects occur in the 3-D spectrograms as packets, i.e. periodically combined with another, lower frequency. An example is a 3-second abnormality; it can be seen as a Gaussian intensity distribution which rises and falls eight times, every 45 seconds. The technique could be optimized as follows.
In areas where earthquakes are common, a series of measurement stations could be used to calculate epicenters and give advance warning. Sferics propagation would be measured in three dimensions (horizontally and vertically) by sector antennas. With other resources (measuring ULF fields with coils placed in X-,Y- and Z-directions; **[46]**, see **Chapter 9.5.1.**), this has already produced initial promising, preliminary results.

9.5.3 Discussion of compiled, essential reports on the best ways to extract abnormalities

Currently, this technique for detecting ULF abnormalities is still very much a work in progress. It is based on a hypothesis. It is desired to simplify the technique, so that it can be optimized in the future. For this purpose, the following text will summarize and critically discuss some essential **empirical patterns**.
It should be possible to predict earthquakes in an optimum, reproducible fashion. As a result, it should be possible to detect structures, as follows (experience in analyzing sferics will result in practical improvements):

- The clearest abnormality structures could be detected and (in particular) immediately seen when Omega signals were predominant. This occurred when cloudy, instable, rainy weather was imminent or present. As shown in **Chapters 4**

to **6**, sferics bursts are formed when discharges are propagated over great distances as electromagnetic waves **[42].** When the weather is wet and poor (low-pressure area) and hence abnormalities characteristic of an imminent earthquake and in particular dominant Omega bursts are superimposed more effectively, then apparently the interactions between the earth's crust and the ionosphere increase additively. The effect of these interactions depends on the atmospheric distance traveled by the Omega signal and the sferics signal.

The opposite is true for atmospheric near-field discharges, in other words nice weather with predominant broadband bursts (this context does not refer to high-energy thunderstorm thunderbolts). I.e., the detectability of ULF abnormalities (among other things) is reduced in the 3-D spectrograms.

- In the far field of earthquakes, no earthquake abnormalities can be picked up before and during thunderstorm sferics activities. The reason is that the broadband bursts (the visible lightning bolts) described in **Chapter 9.3** generate higher sferics field values (by a factor of thousands to a million). These bursts hide the weather-related, invisible, electromagnetic sferics activities. Correspondingly, when the weather situation is instable (as discussed above) with pronounced abnormalities (Omega signals are predominant), then it is best to record and analyze sferics for earthquake predictions in the morning or at night (see the daily rhythm of the sferics (**[41]; Chapter 9.2** and **Figure 9.1.5.1**). The sferics/technics wave propagation interacts with the ULF alternating fields. Before the earthquake occurs, this modulation field product exists in the earth's mantel and the air layers. Due to the aftershocks to be expected, these field products can be measured after the main shocks. Broadband sferics are formed in the near/far field at locations which cannot be predicted. Technics or Omega signals, on the other hand, are formed at fixed locations. It is also assumed that this does cause near-field effects

at the epicenter in the vertical and horizontal sferics propagation directions. The reason is that the above-mentioned terrestrial interaction of the earthquake with the earth's mantel and the ionosphere is most likely greater at the epicenter. This agrees with the increase in the frequency of abnormalities (the abnormalities occur at intervals T which decrease).

- When predicting earthquakes, difficulties are also encountered if at a distance of 9,000 to 18,000 km several approximately equally strong earthquakes are to be expected at about the same time, with strengths of around or under 6 on the Richter scale. For an example, refer to the earthquake statistics for the period from 7/2 to 7/3/2002 (earthquakes on the Fiji islands, in Columbia, Argentina and New Guinea). On the related 3-D spectrograms, abnormalities lasting some seconds occur. They are superimposed, one after another. These abnormalities cannot be extracted without a sector or directional antenna (cf. **Figure 9.5.2.1**). Additionally, there are probably variations or beats in the intensity of such ULF envelopes, related to the sferics/technics sum signal.
- By the way: When an earthquake is over, or shifting or movements of the earth's crust have terminated, then these ULF/ELF/VLF effects gradually die down. The exception is when aftershocks can be expected from the same location (cf. above descriptions of the earthquake in Afghanistan starting on 3/25/2002).

9.6. Compilation of main characteristics in sferics 3-D spectrograms which correlate with typical atmospheric conditions, including biotropy

A wide range of sferics audio material was thus obtained, spanning over twelve hours (approx. 5 Gigabytes of data material). That made it possible to perform several hundred 3-D spectrum analyses. Audio files were created from the recorded sferics alternating signals, as tracks with an average recorded length of 2 to 3 minutes. All knowledge gained from the analyses of the sferics/technics recordings was summarized in a preliminary form in September, 2002.
The **conspicuous meteorological characteristics** occur repeatedly. The repetitive patterns show that these conspicuous characteristics can be reproduced. The following, brief bilateral statements can be made. They primarily consider the signal levels, not the statistical frequency as per **[3]**. – The **biotropical effect** on people will be added.

General correlations

- Broadband*[2] bursts starting at around 1 kHz and/or stochastic*[3] spikes/Dirac pulses (distributed over the frequency and time), without extreme variations in the peak levels, with signal dynamics of ± 6 dB, i.e. there are no essentially visible Omega signal **sequences** → nice weather, pronounced *[2] (summer) high-pressure area or intermediate high-pressure area or high-pressure area in winter*[3] <<>> **relaxation, tranquility, convalescence.**
- Very broadband, diagonal (or not vertical) pulses or GURGLING (cf. **Chapter 5**). Low-frequency signal component dominate at the beginning of the pulses (approx. 1 kHz) and for some milliseconds thereafter. Thus, there are no conspicuous Omega signal sequences are visible → nice weather, high-pressure at night (without sun irradiation) <<>> **relaxation, tranquility, convalescence.**
- Broadband burst distribution combined with Omega signals at around 15 kHz → low-pressure weather situation or continual rain or approaching low-pressure front <<>> **slight relaxation ("increased" tranquility) ranging to tiredness or weariness/fatigue/depression.**
- Dominant Omega signal sequences at the characteristic frequency at 12 kHz and/or 12. 5 kHz and/or 15 kHz nearly without a broadband burst component → foehn or before a weather change with a considerable drop in temperature (cold front) <<>> **"increased" stimulation ranging to aggression, ill temper, stress.**
- A spectral mixture of sferics and technics with at least one, i.e. several Omega signal components (one level dominant component at one of the frequencies 12/12.5/15 kHz). There is also a proportional series of usually much weaker broadband bursts (a kind of background sferics pulse noise) and more seldom high-energy bursts (higher dynamics, i.e., variable signal peaks, with ± 12 dB variations between Omega signals/Omega bursts and broadband bursts) →

warm front or intermediate high-pressure area or "mixed weather situation" ranging to fog <<>> **slight ill temper or stress or mildly stimulating.**

- Increasing overall level of sferics signals (primarily broadband bursts) as well as great variations in the levels of sferics signals (high dynamics between ± 20 and 40 dB between Omega burst peak level, broadband bursts down to around 500 Hz and strong bursts to frequencies under 10 Hz) → weather is in the process of changing, a thunderstorm (front) is approaching or forming <<>> **agitation**.
- The existence of the technics/Omega signals predominantly at both 12 kHz and 12.5 kHz can be related to local Alpine wave reflection effects. This depends on the weather situation (gapless snow cover), similar to technical "mirror effects" encountered with waves → intermediate high-pressure area, after the entry of cold air <<>> **harmonious, almost relaxed.**
- Increasing overall level of sferics signals beginning at sunrise, with a maximum in the evening before sundown (see also the daily rhythm in accordance with Baumer **[3, 41]** as per **Figures 9.2.6** and **9.2.7**).
- Increasing overall level of broadband sferics signals, in the summertime.
- Roughly stated, during nice weather broadband bursts often have an energy maximum in the spectral range around 13 to 14.5 kHz. On the other hand, range sferics signal level troughs occur in this frequency when low-pressure areas are dominant, forming or approaching.

Rules of thumb for selecting the best nice-weather sferics

- Regarding the weather: Predictable, long-lasting high-pressure area, with those sferics which were sought after in this work, during the first third of their occurrence **[3, 29** through **32]**.

- Broadband spectrum of bursts; in the (early/late) summer without seldom, pronounced peaks (approx. 1 kHz to 20 kHz) The signal dynamics are less than ± 6 dB, relative to a mean broadband sferics signal level. Chiefly in winter, (Gaussian) mixed bursts are encountered. The frequencies and times of these bursts vary stochastically. The signal dynamics of these bursts are also low, with easily seen Omega signal sequences.
- No or comparatively minimized technics signal components (troughs can be found at 50 or 60 Hz, 12/12.5/15/16/18 kHz). Any such components must then be filtered out digitally.
- Differences in night-time and day-time nice-weather sferics must be taken into account (tonal tweeks or gurgling sounds can be recognized, starting at dusk and extending through the night).

In this overview: When the temporal dynamics of sferics spectrum analyses is considered, a further phenomenon related to the theoretical description of wave propagation deserves attention. Observation of the above-mentioned thunderbolt activity (see **Chapter 9.3**) lead to the following explanation. During and after thunderstorms, the intensity of invisible sferics discharges increased steadily, compared with the technics. These discharges changed the analyzed, atmospheric alternating fields in a linearly continuous manner.
An example: Before thunderstorm discharges, frequently recorded 12- to 15-kHz Omega signal components were dominant.
Only broadband sferics patterns (with frequency components above 1 kHz) remained, after a thunderstorm had passed, or when the only sheet lightning was at a distance of at least 100 km, or when the so-called "thunderstorm anvils"

(thunderstorm front) collapsed at night. The spectrogram structure of these sferics patterns was similar to those for nice weather.

The lightning bolt sferics level measurable in the volt range returned to normal values (burst values smaller than around 1 millivolt or less than 1/10 nT). In the atmosphere, first Omega signals were picked up at 12, 12.5 and/or 15 kHz. Thereafter, these fields were replaced by broadband discharges or AIS. In the 3-D spectrograms, this transition of the alternating signals appeared in the same sequence.

Due to the wavelengths (20 km at 15 kHz), it was not expected that the Omega signals would be attenuated or masked for the given atmospheric conditions **[42]**, since pronounced low-pressure systems hundreds of kilometers away let the Omega signals pass with little attenuation (see **Figure 2.3** and cf. **Figure 9.7.1** with **10.2.4** or with **10.2.6)**.

Hence, after such thunderstorms the transmission medium air must have other properties which are typical for this (see **[36, 37, 42]**).

It should be noted that apparently:

- typical electromagnetic oscillations of the atmosphere (see **Figures 4.1.1** and **4.1.2**) or
- synthetic alternating fields with a natural frequency/frequency of oscillation in accordance with the Omega signals

penetrate fog, haze, high humidity and rain much better (attenuated less), because of their resonance properties. During the analyses, with regard to intensity broadband bursts are then much less conspicuous.

For broadband AIS, during nice weather the air layers are a different attenuating wave-passing medium. This process takes place over all main ELF VLF frequency components. And this process is different depending on the direction of

propagation of discharges. That makes it all the more surprising that on the other hand as soon as the sun goes down clicking, tweeks or the sounds mostly associated with nice weather (cf. **Figure 5.2** or discussion of "whistlers" in **Chapter 5**) can be heard. Starting at dusk and through the night, these noises reach their peak.

The conditions present from the highest air layers to the ionosphere or solar radiation as such probably play a major role in electromagnetic wave attenuation or in supplying the (radiation) energy for atmospheric discharges (when air masses move in the vertical and horizontal propagation directions). Related to this electrophysical description, the whistlers **[36, 37]** are described in **Chapter 5,** including **Figure 5.1**. They travel along the cosmically distributed geomagnetic field lines. They are "slowed down" (noise with a falling frequency <> speed of propagation reduced). Maybe the signals causing gurgling sounds also escape the earth's atmosphere briefly but take a shorter path than the whistlers.

9.7. Genuine sferics and technically caused sferics

The previous **Chapters** (**2.1** or **8.2**, among others) contained references to interactive, electromagnetic, atmospheric connections. An example: When electromagnetic waves in the kilohertz or Megahertz range are sent into the atmosphere by a broadcasting station, sferics discharges can be perceived all over the world in a "piggy-back" fashion on the respective transmission and reception frequency. This assists meteorologists in globally locating thunderstorms.

When the low-frequency field components of a radio station are demodulated, sferics can be heard and analyzed. These sferics are picked up via the vertical AIS reception antenna. They resonate dynamically with the music and voice signals. Here, too, the above-mentioned "pulling" appears to play a role. Here, however, it relates to the temporal signal structure when recording the sferics discharges. Periodical technics are probably superimposed on the natural-stochastic sferics. An example for such technics are the 50-Hz oscillations of the power grid. Refer to **Figures 9.7.1** and **10.2.2**. They show technics with packet-like Omega signals and 50-Hz permanent harmonics. This superimposition would appear to periodize the chaotic, atmospheric pulse discharge behavior.

However, this only applies to the location or moment of recording (including later signal analysis), which clearly cause errors when measuring alternating signals. This is because the sferics discharges cannot be influenced over great distances by merely local, relatively weak technics sources.

Finally, these technics interfere with the sferics alternating signal. When this signal is measured, its stochastic temporal behavior and random dynamics must be apparent. In unadulterated nature, the random dynamics of the signal's temporal

behavior is different (nonperiodical AIS). At this point, the cause has not be identified for certain.

In particular, this phenomenon can also be observed near high-voltage cables (deep bass short-circuit caused by a human who is coupled in, as per **Figure 6.1.2**: When there is less 50-Hz hum, fewer sferics signals are recorded).

Some people who are meteorosensitive and react keenly to electrical fields speak of ill temper which mostly varies in time periods of some ten seconds or minutes. For certain aggressive weather conditions, this is entirely plausible.

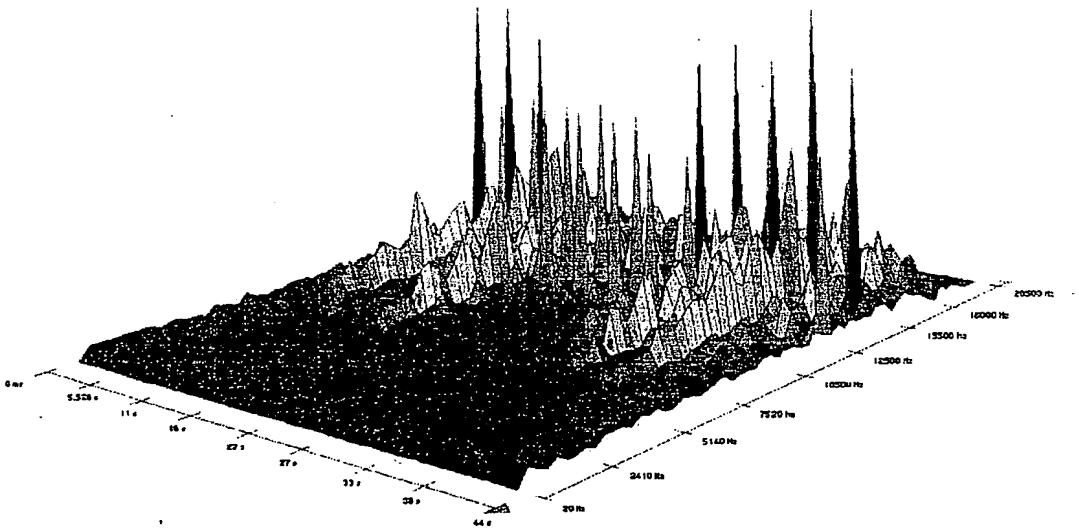


Figure 9.7.1: Three-dimensional spectrogram analysis of sferics activities on 4/17/2002 at 10 a.m. (recorded at Penzberg/Upper Bavaria) with the following meteorological situation.
End of the low-pressure area, the rain showers stopped, overcast, 12 degrees. It could not be determined how people felt. The large low-pressure system left the area, as shown by 15-kHz Omega signal components. The 12-/12.5-kHz Omega signal components are indicative of the termination of the low pressure without a cold front. Also, more uniform broadband bursts can already be seen (a sign of

transition to high pressure). Further, packet-like alternating Omega signals at 12/12.5 und 15 kHz are conspicuous. They presumably were created by stimulation by periodical technics or ULF fields from the center of the earth.

Chapter 10
Pilot blind study for demonstrating the effects of sferics on people in selected normal, nonshielded living conditions

10.1. Motivation for the study

Many authors **[1, 3, 6, 7]** feel there is no doubt that natural and technical fields affect people. The (maximum or limit) field value cited by institutes appears to vary from country to country; it also depends on the population density and technical use **[2, 25]**. I.e., the installed expensive energy/transmission/communication technology is responsible for the industrial, human standard of living on earth. This technology usually determines the respective technics limit value of the evident fields, which is based on the technical state-of-art of the devices.

Mobile radio is an example which shows the extent to which the sensitivity of continuously further-developed mobile phones makes it possible to successively reduce the transmission power of the communications systems.

The desire to utilize the comforts of modern technology often opposes new equipment for sferics-based weather forecasting (in accordance with Baumer [3]). Due to the interference from the 50-/60-Hz power grid, such forecasts would require expensive developments.

It is not the intention of this work to analyze or forecast the weather. Rather, it was desired first to identify and substantiate nice-weather sferics. In parallel, it was desired to investigate the corresponding electromagnetic sensitivity, including meteorosensitivity in a prestudy or pilot study.

It was desired to use a relatively large number of test persons, in order to obtain findings which are statistically highly significant. Within the framework of new (epidemiological) studies, conditions had to be created for demonstrating sensitivity entirely free of suggestive influences, in a room-ergonomically relaxed setting resembling an office or apartment. The decision was made to not equip the test site with artificial electromagnetic shielding. This would have run contrary to realistic conditions, while enabling falsification of results. In addition, the cost was reduced this way.

With these room-ergonomic conditions, it was desired to test the effectiveness of "artificially fed-in", natural sferics compared to existing, synthetic technics during realistic tests. The hidden intention of this work related to the following application. It is desired to develop future, therapeutic means or equipment, depending on the need. Based on natural, purely electromagnetic techniques, these means are to mask or considerably reduce individual meteorosensitivity,

electrosensitivity, etc. (cf. sferics alternating field irradiation). This masking or reducing should be independent of time or place.

10.2. Foundations: test signals, experimental setup and procedure

As a basis, for around four months 29 persons were available for an epidemiological short-term study. These persons were engaged in a wide variety of work and professions, with an approximately equal number of males and females; their ages ranged from 7 to 70 years.

Twelve titles with various sferics and technics signals were played for the test persons; half of the signals were sferics and half were technics. These titles had been recorded as follows.

The original sound carrier title sequence 1 to 12 is directly equivalent to the related 3-D spectrograms of **Figures 10.2.1** through **10.2.12**. This sequence of titles was discussed and analyzed in **Chapter 9** above.

1. On the Canaries/La Palma island (west side, at the town of Tijaraffe); stabile, nice weather, 4.7 kHz narrow-band, picked up with a coil (1985).
2. On the island of La Palma 50-Hz interference signal, nice weather with slight instability (in the evening, dusk, February, 2002)
3. A high-pressure area in formation, directly at the Lake of Constance (town of Wasserburg, in the evening, 3/29/2002).

4. On a mountain peak in South Tyrol (altitude: 2,000 m), snow cover, one day before a bad-weather front, in the afternoon at 4 p.m. on 4/4/2002; Omega signal sequences with natural frequencies at 12, 12.5 and 15 kHz.
5. Aggressive afternoon weather, with a temperature of 17 degrees Celsius in February; before a sudden onset of cold weather with a temperature drop of 20 degrees Celsius, followed by a snowstorm with lightning, which occurred the same day at 10 p.m. (town of Alling, Bavaria/Germany, 2/23/2002); Omega signals at 12 and 12.5 kHz.
6. Following an onset of foehn and cold weather, cool, cloudy, it begins to rain (town of Iffeldorf, Bavaria/Germany 3/15/2002, 6 p.m.); Omega signals at 12, 12.5 and 15 kHz.
7. Snow cover (temperature around 0 degrees), sunny/cloudy (town of Iffeldorf, after a front had passed, 3/25/2002 in the morning); before major earthquake in Afghanistan; Omega signals at 12, 12.5 and 15 kHz.
8. ELIVIT MOBIL, therapeutic pulse generator; artificial 10 Hz (periodical) pulse for enhancing one's ability to concentrate **[6]**. In the 1970s, a pilot study was performed in a Munich school. In the classes with evident fields, the grades improved an average of 0.5 points.
9. A measurement situation located around 30 meters from railroad tracks (16 $^{2}/_{3}$ Hz, on 3/4/2002) with minor sferics components.
10. Near a broadcast station tower (town of Götzenhain, Germany); mixture of various television, radio, business radio and mobile radio signals plus Omega signals as well as sferics activities (3/26/2002).
11. A recorded mixture of demodulated low-frequency components of GSM mobile radio (900 MHz/217 Hz envelope) plus DECT (1.8 GHz/100 Hz envelope).

12. The radiation of an electromagnetic field a few centimeters away from a PC monitor manufactured by Acer (type G991 with harmonics).

Before the experiment began, the twelve sferics and technics signal WindowsTM .WAV files were burned onto a normal CD player audio sound carrier. For this, the above-mentioned audio signal processing program **[38]** was used in addition to further, not noteworthy, commonly available software in the analysis computer. The desired individual sferics tracks were thus available. Each one was between 12 and 40 seconds long. Each track could be looped infinitely if necessary.

A room was made available which contained typical electromagnetic loads (by current standards; cf. **Chapter 10.3.)**. The following was considered to be especially important:

- The test persons could be seated at a place which was minimally influenced by other sensual perceptions. Thus, they were exposed to few other suggestions.
- They did not know (could not see or hear), to which selection or series of sferics or technics alternating fields they would be exposed (additionally, the selected titles changed from one test person to another and from one experiment to another) and
- Thus, this was a series **blind study**.

The test persons were asked to freely express how they assess the sferics/technics field material, based strictly on their feelings and perceptions (if possible). The material was changed several times. During the A-B comparisons between the played sferics and technics recordings, the task for the test persons was to concentrate on spontaneous bodily sensations and feelings. Examples are sudden sensations of heat, coldness or pressure, tingling or other dynamic changes in how

they felt. Initially, it was expected that these sensations would be quite slight (if at all).

Some of the test persons first had to be trained to perceive the above bodily sensations and feelings, by means of the CD (without providing information on which title should cause what effect.). They had to be shown that the sensations even exist and can be perceived. The sferics/technics signal titles were played in varying sequences. A newly mixed track sequence was chosen for each experiment.

Sometimes, these titles were played repeatedly as an A-B comparison, in order to verify the accuracy of the "blind statements" of the test persons. Each time the title was changed, merely the words "Changing A/B" were spoken in order to indicate the new or different title (each one was either "A" or "B"). The alternating-field generator (source) required for the experiments was limited to a commercially available CD player XL-V252 manufactured by JVC, with a broadband headphone output, capable of producing a maximum of 0.5 V.

A piece of wire, approximately 4 meters long, was connected to the headphone output. This wire was placed around the test person at a distance of around 0.5 m and at a height of 1.2 m, as a Helmholtz coil with one winding (open end, no-load operation). This way, only electrical alternating fields were artificially impressed in the room. In sum, nothing was suggested to the test persons, such as a sheet of paper with items to be marked, title numbers, information on the title numbers to expect, etc.

The experiment supervisor kept written notes. The comments of the persons were retained as free observations and recorded as keywords; i.e., the supervisor did not evaluate or make comments on the experimental procedure. The only assistance

offered was the statement that the test person should concentrate on his or her sensory perceptions. It was desired to compare purely subjective perceptions and feelings, at least either "positive" or "negative", obtained by feeling, breathing, etc. In a few cases, with some test persons this was not possible. For the A-B comparison, this was recorded as a "neutral" situational description. This experimental procedure thus generally corresponds to an (epidemiological) blind study.

The course of the experiments showed that a series of metaphors were being collected in the notes. I.e., the comments were not limited to simple "positive/negative reports". Absolutely no form of pressure was applied to the voluntary test persons. These persons were also not pressured to participate in the entire series of experiments, with all twelve sferics/technics titles randomly changed and compared (as described above). In the later context, this very simple experimental procedure (the initial study) proved to be at least satisfactory or correct.

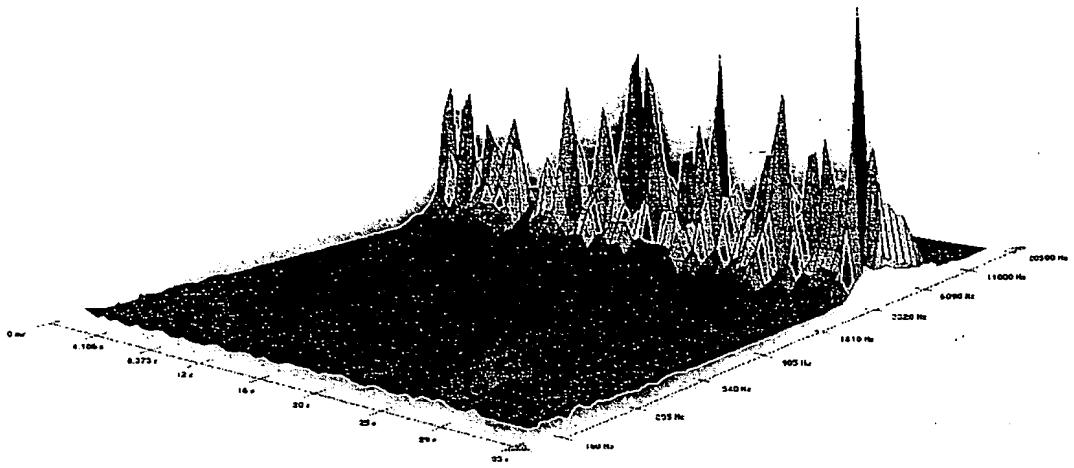


Figure 10.2.1: Three-dimensional spectrogram analysis of sferics activities, recorded in La Palma (Canary Island) in 1985.
The recording was made during nice weather with a coil (10,000 windings, 600 ohms, resonance frequency at 4.7 kHz in accordance with **[40]**).

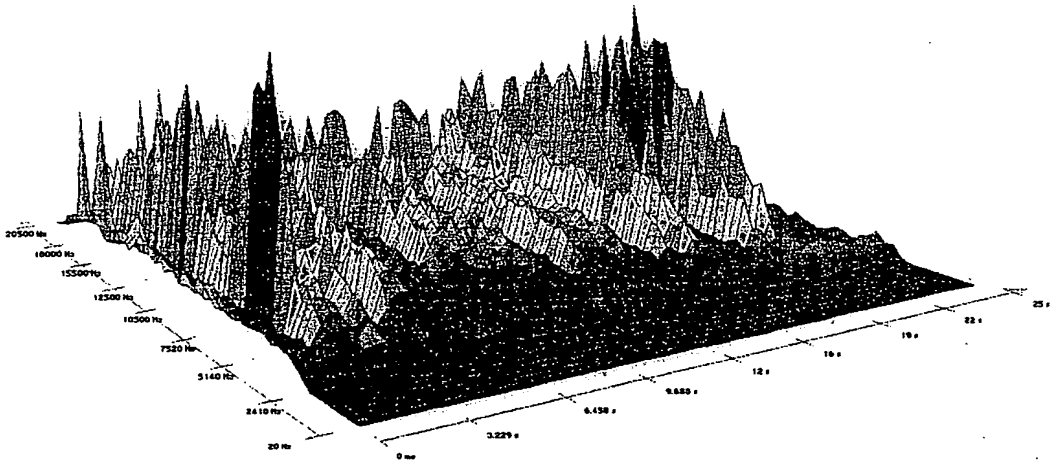


Figure 10.2.2: Three-dimensional spectrogram analysis of sferics activities, recorded in La Palma (Canary Island) 2/8/2002 at 8 p.m. during nice weather and high pressure.
Slight haze, 18 degrees. Technics interference of the 50-Hz power grid was filtered out, including harmonics. The signal spectrum was raised time-continuously at 4 kHz; this is an indication of the interfering 50-Hz harmonics.

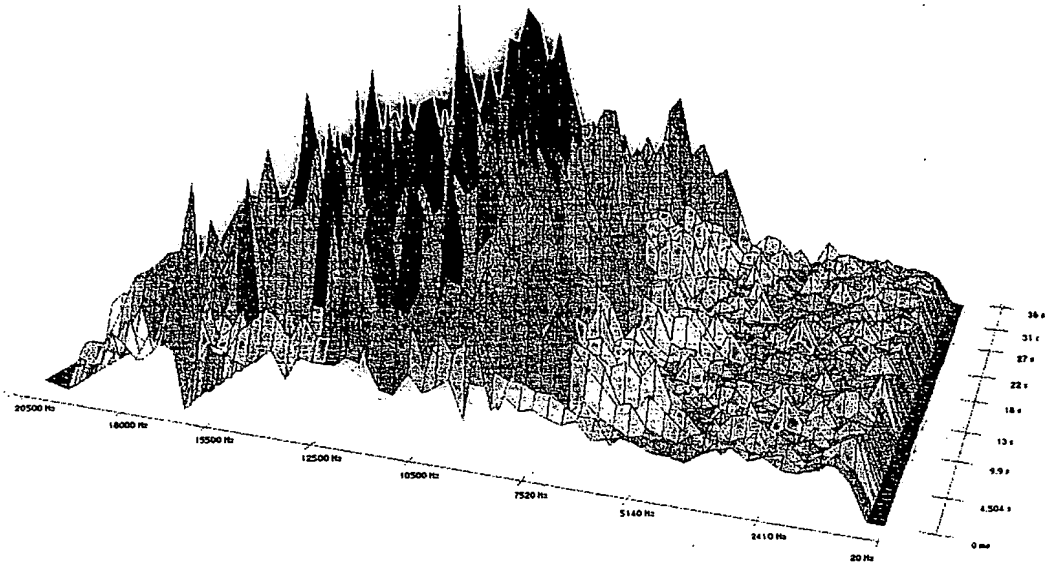


Figure 10.2.3: Three-dimensional spectrogram analysis of sferics activities, recorded at the Lake of Constance directly at the water.
The weather was nice, cloudless with slight haze. Recent local high-pressure area; logarithmic display of intensity (the other figures in Chapter 10.2 are shown with linear resolution).

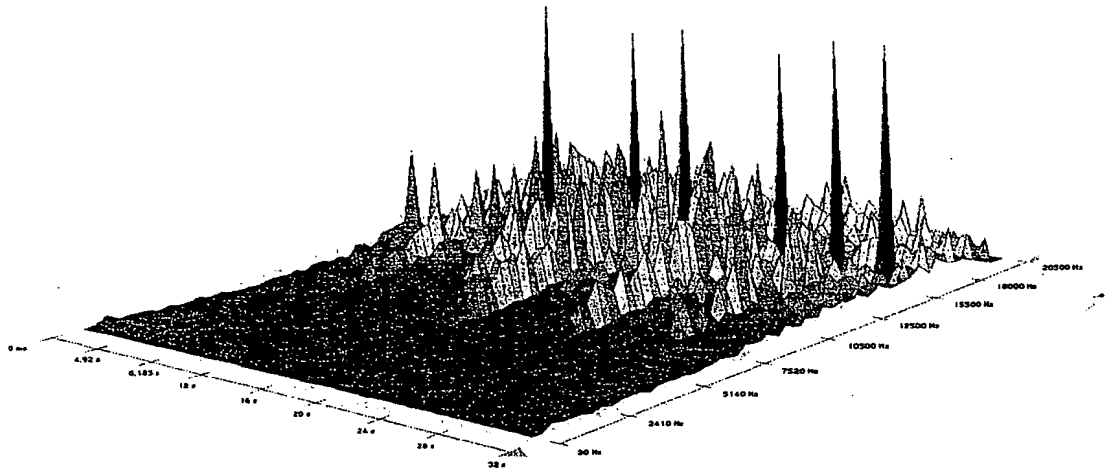


Figure 10.2.4: Three-dimensional spectrogram analysis of sferics activities, recorded on 4/4/2002 at 3 p.m. in the mountains of South Tyrol.
The recording was made at an altitude of 2,000 m (snow cover) nice weather with 30% cloud cover, but around 12 hours before the weather deteriorated (rain) due to an approaching low-pressure area from Northwest Italy (Genua). Conspicuous technics are found at 10.8 kHz (caused by the measurement site in the mountains), 12 and 12.5 kHz and in particular dominant Omega signal components at 15 kHz. Relatively strong broadband bursts are indicative of the weather, which was still nice.

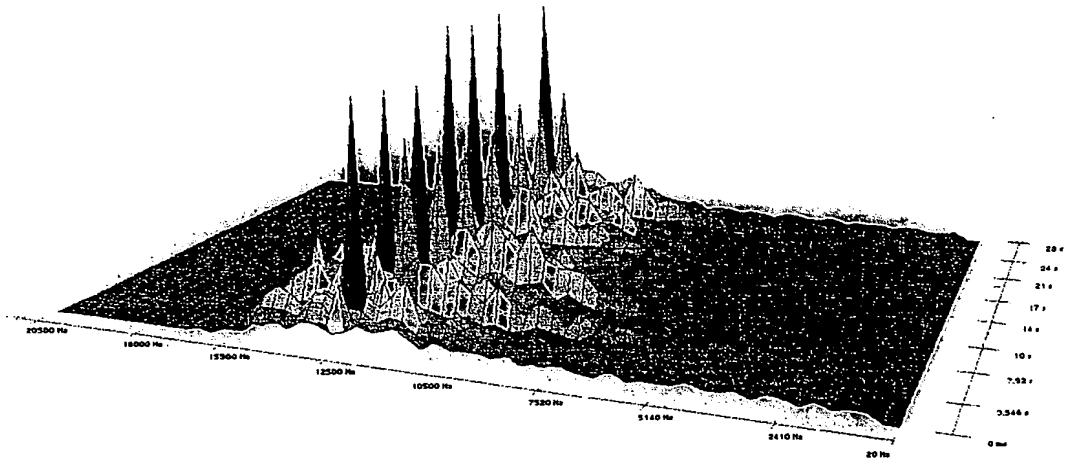


Figure 10.2.5: Three-dimensional spectrogram analysis of sferics activities, recorded on 2/23/2002 at 2 p.m. in Alling/Upper Bavaria during weather which was unusually warm for that time of year (17 degrees).
Sunshine and cirrus cloud cover, imminent flux of cold air as the evening approached. Around 10 p.m., the temperature dropped 20 degrees followed by snowstorm with lightning. The conspicuous Omega signal components at the frequencies 12.5 kHz and weaker at 12 kHz should be noted. On the other hand, there were no visible technics at 15 kHz low-intensity AIS.

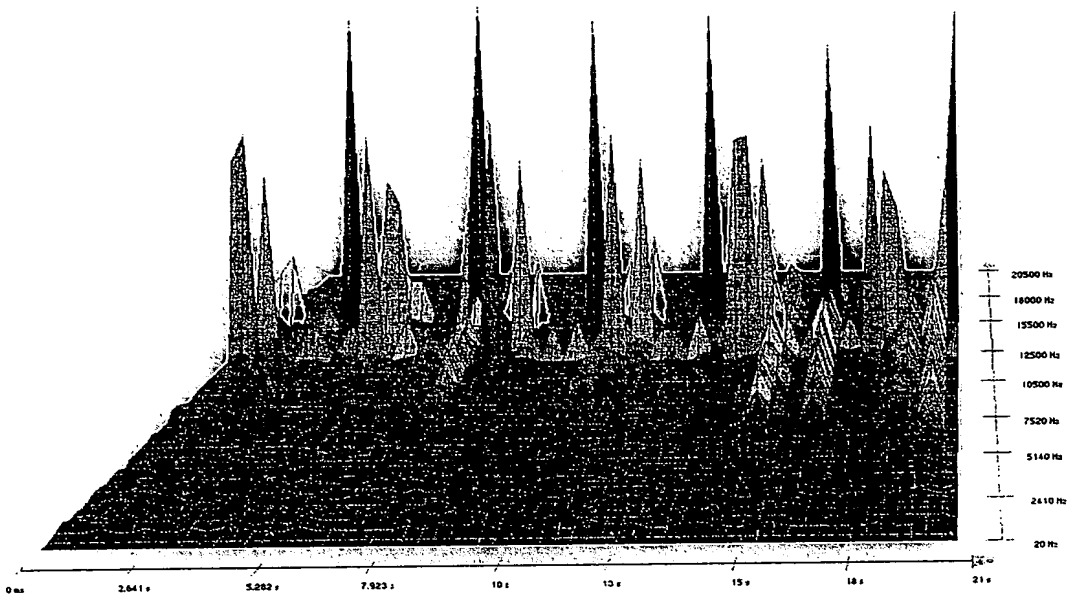


Figure 10.2.6: Three-dimensional spectrogram analysis of sferics activities, recorded on 3/15/2002 at 6 p.m., in Iffeldorf/Upper Bavaria as it began to rain and as the foehn dissipated.

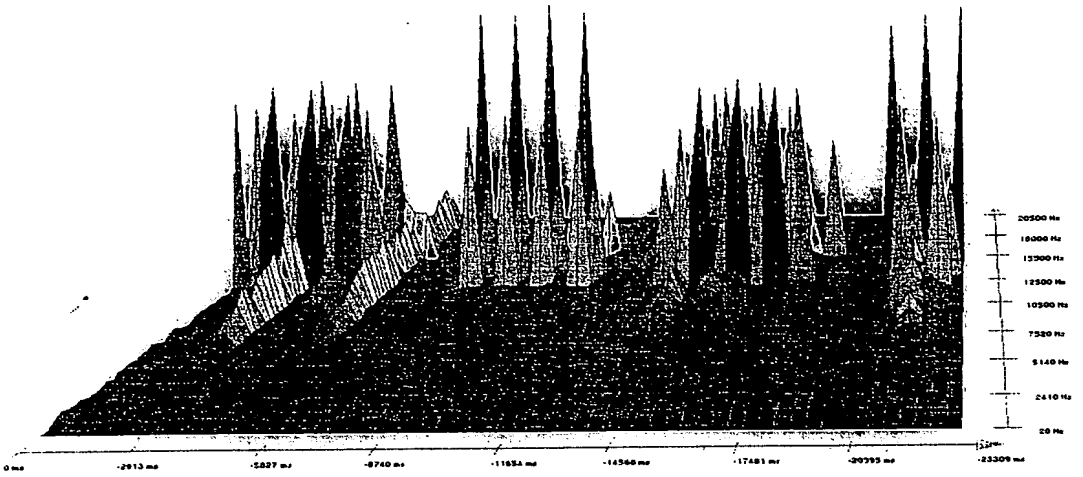


Figure 10.2.7: Three-dimensional spectrogram analysis of sferics activities on 3/25/2002 at 10 a.m. (recorded at Iffeldorf/Upper Bavaria) with the following meteorological situation:
A cold front had passed through. In all of Bavaria, there was 3 - 5 cm of snow cover, the temperature was -1 degrees, Cloud cover alternated from 0 to 30% cumulus cloud cover (compare with the front view of the graphic, in accordance with Figure 9.5.1.1: Afghanistan earthquake).

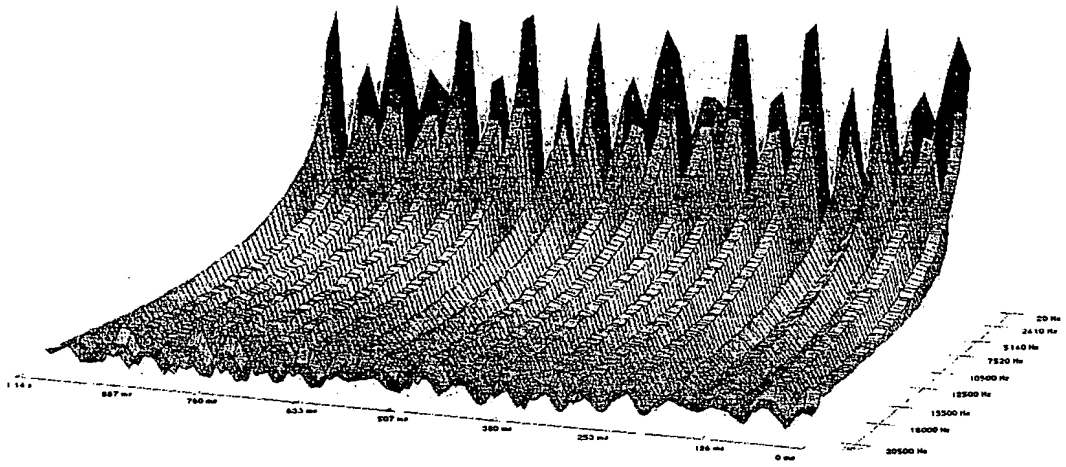


Figure 10.2.8: Three-dimensional spectrogram analysis of a 10-Hz pulse for enhancing one's concentration.
In terms of phase, this pulse occurs at ± 180 degrees (sinusoidal halfwaves). **[6]**.

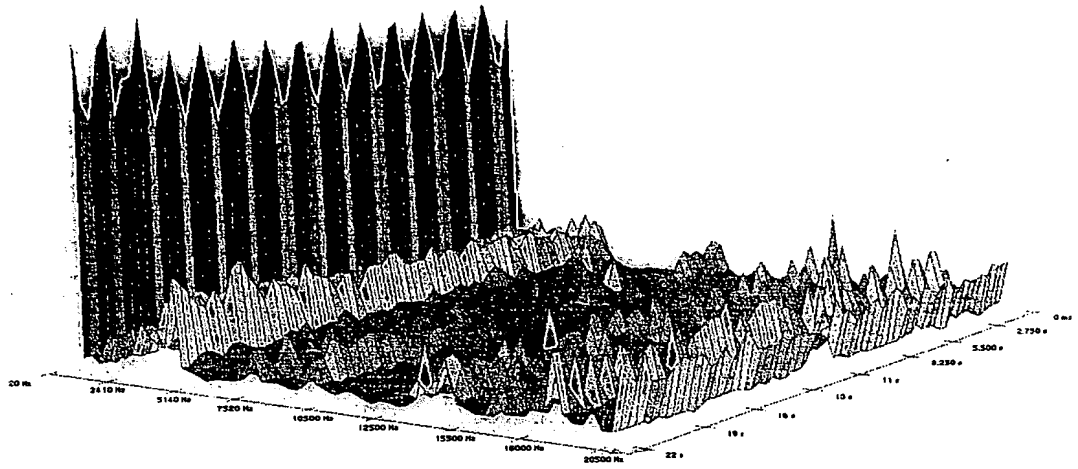


Figure 10.2.9: Three-dimensional spectrogram analysis of a mixture of electromagnetic fields (sferics and technics starting at 16 $^{2}/_{3}$ Hz).
This was picked up at a distance of 30 m from the elevated tracks of the German railroad, in Bochum-City on 3/4/2002 at 12 a.m. during overcast weather. The spectrogram shows railroad harmonics and slight sferics or technics in the kHz frequency range, which appear as individual needle-shaped pulses or signal walls.

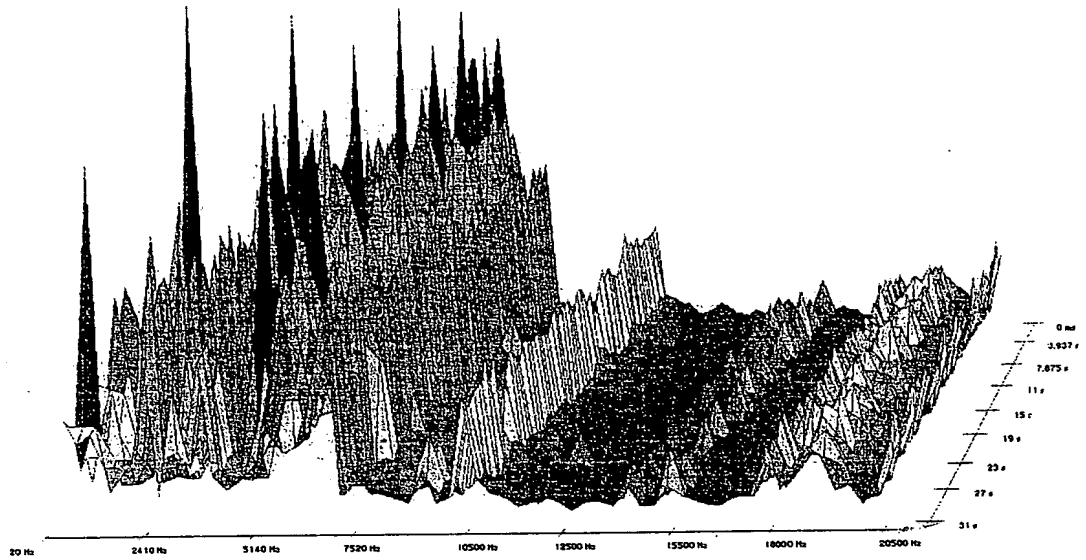


Figure 10.2.10: Three-dimensional spectrogram analysis of technically caused, very dominant electromagnetic fields without visible sferics.
Picked up at a television and radio tower with various RF transmission services. The demodulated components of MW/FM radio signals and GSM mobile radio were picked up directly at the DAT input, without a demodulator, at the perimeter fence of the tower, which was 20 meters away. This recording was made on 3/26/2002 in Götzenhain, Germany.

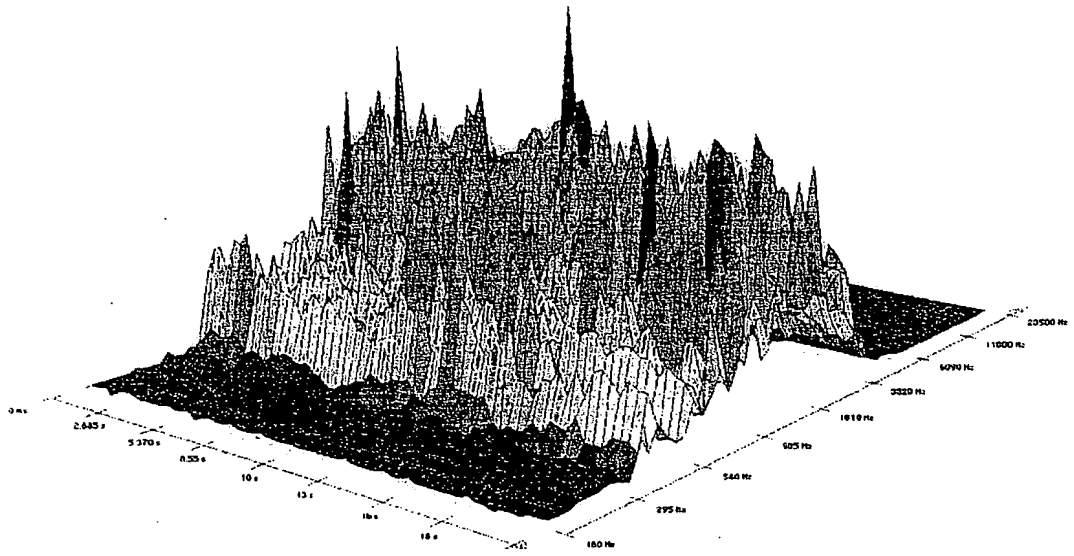


Figure 10.2.11: Three-dimensional spectrogram analysis of the demodulation product of the AF component of DECT wireless telephones and GSM mobile radio which was converted into an audible signal (Gaussian pulsing at 217 Hz). Using a broadband microphone, the audio signal sum produced a recording signal at the speaker of the measurement device "Digimeter" manufactured by Endotronic, in accordance with **[40]**. This recording was made in November, 2000.

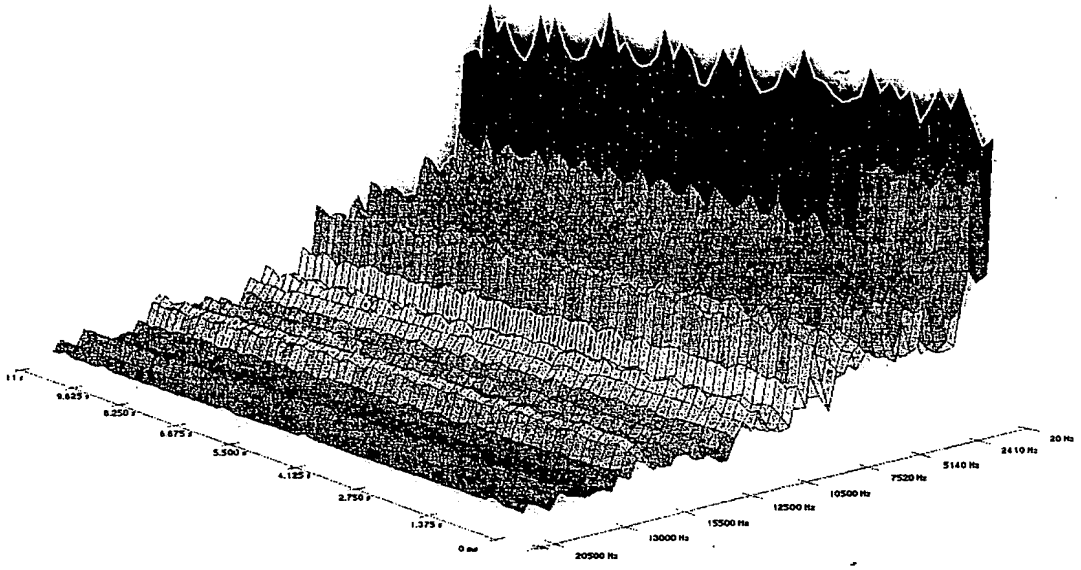


Figure 10.2.12: Three-dimensional spectrogram analysis of purely technically caused electromagnetic fields in the front near field of a computer monitor manufactured by Acer (type G991).
This recording was made in February, 2002.

10.3. Checking and harmonizing the intensities of electromagnetic fields already present in the experimental room with the additive field strength of played-back sferics and technics signals

As mentioned above, there is considerable debate and discussion of limit values of line voltage (50 Hz) or electrical power for trains ($16^{2}/_{3}$ Hz). More recent discussions reveal concern about mobile radio applications. Hence, it would be plausible to generate suitable AC voltages or field intensities in a comparative blind study.

It is generally assumed that if the field strength is too low, then no effect takes places. On the other hand, the test persons should not be harmed by the experiments. Therefore, generally recognized low field values and specifications based on TCO'99 should be applied (limit values: electrical field <> some V/m, magnetic field at most 200 nT).

The WHO or the German Commission on Radiation Protection recommends maximum field values of 100,000 nT and some thousand V/m (26th Emission Protection Regulation; **[10, 11, 12, 13]**). These values seemed to contradict numerous epidemiological studies. Certainly, they are far removed from field strengths encountered in unspoiled nature during normal weather **[17]**. The latter values are in the range of milli- or microvolts, or pico Teslas.

There is an example of how artificially generated sferics influence the growth of blood platelets. It was desired to use that experiment to verify the chosen field intensity **[18]**: In the 1970s, the influence of electrical sferics fields (pulses) in the

ELF/VLF frequency range in the millivolt range became clear. Hence, at that time, warnings were issued regarding fields stronger than 0.4 V/m. This level of limit values was used for the experiments discussed here, in order to avoid harm to the health of the test persons.

These experiments were viewed as a pilot study. Initially it was not known if the test persons would be able to describe any effects, for the given, normal conditions of a laboratory compliant with TCO'99 specifications (without specially designed measurement rooms equipped with AF and/or HF shielding; cf. **[34]**).

In other words, there was absolutely no data material on experiments involving such ELF/VLF frequency ranges with natural and artificial evident fields, compared to common living or office settings.

In order to document this, in the experimental laboratory field measurements had to be made in the low-frequency and high-frequency range. The following results of measurements of evident technics fields in the laboratory document these fields:

- Low-frequency magnetic field >>> around 5 nT to 10 nT (depending on the time of day).
- Low-frequency electrical field >>> approx. 2 V/m to 5 V/m.
- High-frequency sum field >>> 50 V/m to 250 mV/cm² (mobile radio transmitter at a distance of 600 m; DECT telephones at a distance of around 10 meters).

The following measurement equipment was used:

- "el-mag 014", manufactured by Gen-Tron (measurement range: 0 Hz to 5 kHz; 1 nT to 1 mT) as well as an "Electrosmog detector", manufactured by MEDLINE (measurement range: 50 Hz to 10 kHz; 1 nT to 1,999 nT),

- "E-Sonde GKM 03", manufactured by Gen-Tron (measurement range: 5 Hz to 5 kHz; 1 mV to 250 mV) and
- a "Digimeter", manufactured by Endotronic (measurement range: 10 kHz to 10 GHz; 1 μV/sq. cm to at least 10 V/ sq. cm, depending on the measurement antenna being used).

It must be stressed that in towns or cities the 50-Hz mains, house DECT telephones, mobile radio signals, etc., mask the sferics normal-level signals with regard to the total intensity, which is measured as a composite signal. (The sferics normal-level signals do not include the peaks during aggressive or poor weather, such as thunderstorms). Additionally, exterior walls and windows inside buildings attenuate the AIS by 20 to 40 dB.

A further question is why this study was not performed in shielded surroundings. This question can be answered by repeating the intention of the overall investigation. It was desired to measure and reproduce healthful, pleasant, nonpathological sferics under conditions such as poor weather, unpleasant or pathological local conditions, or stress situations. It was further desired to therapeutically hide the undesired technics or poor-weather sferics, by creating a "positive" signal superimposition.

Finally, the overall measurement level was examined, based on the above-mentioned DAT recorder at the place of the test persons in the test room, including the reception antenna element. This was done in order to measure the alternating fields produced by the audio signal recorder and to compare them with those in undisturbed nature.

Some of the signal-statistically denser technics/**sferics** signal combinations were up to 10 times higher than the recorded value. However, the weather sferics

radiated by the wire were approximately equivalent to the realistic free-field value. These sferics were approx. 6 dB to 12 dB higher. This relates to lightning bolts, which were not recorded or reproduced. Their actual voltage peaks would be some kilovolts per meter. In particular, the weather sferics radiated by the wire were below the specifications of [17].

In other words: Normal-weather AIS field values of some 10 μV to the millivolt range were found in undisturbed nature.

In the laboratory setting described above, in contrast, the artificially radiated AIS/technics extended from millivolts to the ten-millivolt range. (Compare this with the above-mentioned synthetic AC voltage or technics in the mV to V range).

10.4. Compilation of the initial blind test results

The log of the epidemiological A-B comparisons of the sferics/technics sensitivity of random test persons also includes specifications ranging from 0 to 100%. These specifications are designed to indicate the reproducibility of the reports in an A-B comparison cycle, with several repetitions (statistic reliability or repeatability in experiments). Accordingly, there were some erroneous, varying reports (report significance < 100%). In the blind test sensitivity comparison (time shift within a few minutes), these reports occurred relatively often for some similar atmospheric alternating signals. That is, 100% means that all repeated reports of a test person were the same in the experiment, or the correlation = 1. Correspondingly, unreliable reports are assigned a smaller percentage. At the same time, this also means that a test person's reports did not produce totally contradictory results when comparisons were repeated later (accuracy < 50% ~ coincidence).

This assessment is not supposed to indicate report significance as a precise percentage. Rather, this assessment is supposed to demonstrate which titles (or electromagnetic contents) apparently had a highly reproducible effect on **one specific test person** without suggestion. The names of the test persons were made unrecognizable. If required, these persons can be asked for permission to release their names. The names could then be revealed, in order to verify the information provided here.

The following is the original version of the experimental logs in the form of brief notes, based on titles 1 through 12 of the CD of alternating fields:

1) AlLey: Feels general difference between 5 tracks (100% match/verification) as well as between track 3 pleasant/neutral and 5th oppressive track 10. (4/11/02)

2) BeDel: Feels general difference (100% match/verification) as well as tiredness/fatigue head- and neck ache during track 3 "went away within a few seconds". Able to feel all contents of the recording in individual tracks (approx. eight different ones) (*[la]*, cf. reports: twinging, pressure during track 10 < more unpleasant, track 3 relaxing, made him (or her) laugh).

3) MaHar: Feels general difference (100% match/verification) and able to describe the contents of each of the six individual tracks *[la]*, above-mentioned reports.

Repetition of the test with test person 10: sensitivity to weather situation clearly described; some organic reactions; in particular track 8 bad, track 10 very bad.

4) KJ-Sch: Feels all contents (100% match/verification) and details of all tracks very acutely. 10-Hz burst has an aggressive effect - surprising/amazing. Nice-weather sferics tracks 1-3 the only relaxing ones; best/neutral/soft effect track 3.

5) WaHes-FFG-Hartm (50% match/verification for **three** persons; they spontaneously tried to feel the electromagnetic effect of half of the tracks/titles): Always felt A-B difference as well as difference between tracks 2,3 <> 9,10 (4/14/02 during a conference)

6) WaSö: Feels all contents, weather conditions and biotropy from all tracks very acutely (100% match/verification); remarkable > track 5 = aggressive sferics "pulls skull apart". Technics produced the appropriate perceptions (track 8/railroad = narrowing, radio = track 10 "unpleasant"). Track 3 better/more relaxed/more calming than track 2; the test person compared some track contents/fields with the appropriate weather condition biotropy. (4/16/02)

7) LBar: Feels general differences (but 10% accuracy). With the exception of track 9/railroad as well as track 8 (10-Hz burst <> neutral, no sensation) perception exactly opposite to track contents.. Track 2 or 3 uncertain (tingling), worse than track 10.... (4/16/02)

8) ThWi: Feels all contents (80% match/verification). Track 3 the most pleasant one (pleasant, soft) and more pleasant than track 2 (slight 50-Hz component). Positive report on track 11 (mobile phone/DECT) + 12 (PC) <> contents swapped and track 8 (10-Hz burst <> neutral, no sensation).

9) GLey: Track 1 > tingling of the nose and scalp, track 2 > pressure/tickling of the nasal area, track 3 very pleasant/relaxed, track 5 > slight pressure on ears plus buzzing, track 6 effect not as negative as track 10 (this was the **most negative** track), track 9 pleasant warm feet, cool hands and slight sensation of a draft, track 10 much pressure (on thyroid gland..) on ears plus buzzing, track 11 hands and feet warm, track 12 tickles in head area; feels all contents (90% match/verification). (4/18/02)

10) MiMil: Track 1 not so pleasant, track 2 oppressive, track 3 relaxing/"I feel like taking my shirt off, like at a beach", track 5 stimulating, track 6 calming, track 7 fairly pleasant, track 8 fairly neutral, track 9 unpleasant, track 10 very unpleasant, track 11 neutral/stimulating, track 12 neutral; 90% match/verification. (4/19/02)

11) DaKö: Track 3 very pleasant/thoroughly relaxing, tracks 2 + 8 fairly neutral/slight pressure, track 9 with pressure on chest area, but "pleasant/almost warm feeling", track 7 almost like track 2, track 10 great pressure on chest, tracks 1 + 11 + 12 not as pleasant; 80% match/verification. (4/20/02)

12) AnKö: Change between technics bad - during track 9 "Stop" >> track 3 (generated relaxation and appetite following unwellness in the evening caused by a

middle-ear inflammation. The test person was a child; due to tiredness in the evening during the test, all technics resulted in striking, emotional reports, such as "Stop". On the other hand, "comparatively positive" sferics were relaxing; 70% match/verification, because no significant report was made on "negative" sferics. (4/20/02)

The log was later checked; it became apparent that the above-mentioned notes did not say enough. For this reason, it was desired to optimize the notes of the test persons' comments.

The following is a tabular summary of reports on test persons 13 and 14.

Table 10.4.1 Summary of questionnaire results for two selected persons, regarding the effect of exposure to artificially reproduced sferics and technics alternating fields

Played CD track no., title/summary of assessment of field contents	13. EvTsch: (4/25/02) (70% match/verification)	14. SiEck: (4/25/02) (100% match/verification)
3/"positive" 5/"negative" 10/"negative"	Pleasant Almost like title 10 Very unpleasant	Pleasant, cool Attacks the body; "sucks the energy out of me Extremely unpleasant
12 2/"positive" 6	Not much different than title 10 cooler	Presses on the chest (*1) Lighter, not as heavy as title 3 Broken shoulder of the test person twinges (*2)
7 9/"negative" 11 8	"I feel my heart beating, unusual" (*3) "There is something wrong with my pressure equalization" (*4) Blind test was aborted – it was too demanding.	Inner agitation, not bad and not good, not very harmonious (*3) Pressure in the ears, "Effect of distance, far away" (*4) Compared with title 3: "I feel smaller", circulation-enhancing (*5)

Notes on markings for the table

*1 → Title 12 is a recording of a PC monitor alternating signal. PC monitors are placed before the computer user (before the "chest").
*2 → This was a recording of a weather upheaval (after foehn). It is appropriate here to refer to the well-known phenomenon of "scar aches".
*3 → Both test persons had experienced earthquakes personally. "Agitation" and faster "heart beat" can be expected of those who have experienced an earthquake, even if it was minor.
*4 → The magnetic VLF fields of the railroad system at $16^{2}/^{3}$ Hz appear to cause uncomfortableness stemming from the unconscious. The test persons remember experiences such as air-pressure variations caused by train rides up or down a mountain, equalization of pressure. Or these VLF fields evoke e.g. the sensation of going on vacation.
*5 → Scientific studies conducted in the 1960s and 1970s **[1, 6]** indicate that these fields have a stimulating effect and improve one's mental concentration. The report significance of the 13th test person is poor, because he or she felt overburdened or tired towards the end of the blind test.

Starting with the following test person 15, the interrogations (including the recorded comments) on well-being were noted as direct comparisons of tracks. A comparison of title/track A with B was abbreviated as " track A <Text> B". The following results were collected:

15) SiStei: In general, few differences were noted (sensitivity training was necessary). Track 3 is "nicer" than 5 + 6 and "freer" than 9, track 8 more pleasant/neutral, track 3 freer than 10; during track 11 better in head than 9; track 10 dull, not as pleasant as 9. Finally 70% match/verification. (6/24/02)

16) ReMart: Clear sensitivity, with 100% accuracy. During track 10 the "nose closes" compared with 3 – "intolerable"; track 9 "applies pressure" compared to 7,

but 9 not as bad as 10 - "not as bad"; track 7 almost just as good, possibly identical with 3. (6/27/02)

17) Dr.Brin: Track 3 freer than 10, track 10 "unpleasant feeling of pressure", track 12 compared to 10 "neutral/more pleasant", less pressure; during track 5 compared with 7 pressure on ears or feeling of obstruction, tingling on skin, "light, tipsy like after a beer"; track 3 compared to 5 very neutral (tingling gone); track 9 applies pressure, somewhat unpleasant plus feeling of warmth regarding track 3; track 11 somewhat more neutral than 9, but track 11 not as neutral as 3; track 8 neutral compared with 11. 100% accuracy. (6/28/02)

18) Ch.Will: Track 3 compared to 10 nose cooler and arms heavy during 10; track 9 tingling compared with 10, otherwise 10 more neutral; track during 12 the sensation is slightly cooler than for 7 with pressure in head; "goose bumps" during track 3 compared with 9. During track 6 "tingling in fingertips" compared to 2; track 5 tingling/more agitated than cool track 3, pleasant; reported "generally few differences ". 90% accuracy. (6/28/02)

19) PeHar: Comparison of track 12 with 4 "drowsy, giddy" during 12; track 7 and track 12 pressure during the latter (not as bad as 10 - retroactively); track 3 and 10 produce pressure on frontal sinus/shoulders, eyes smart/tingling, hands sweat during 10 (during track 3 quote: "Now it is becoming clearer"; regarding 10: "I am familiar with this feeling"), comparison of 12 to 10: all sensations of track 10 gradually, continuously return to normal, head clearer but tingling in shoulder area; track 5 compared with 3 with report on 3: "Now, I simply feel good"; track 6 compared to 5 "much nicer, uhm, pulls up behind my ears/pressure"; track 9 compared with 6 test person quoted as saying "wooh, that is awfully unpleasant", irritation on chest with coughing, "is like polluted air (track 9), everything

beforehand was pleasant"; track 6 compared to 8 cooler breath/air is reported, whereby 8 "nose is more swollen"; track 3 compared to 8 – quote was, "that is more pleasant"; track 2 compared with 8: 2 is related with odd sensations in the person's mouth (tingling/twinging of teeth/filling... must move mouth intentionally); track 8 compared with 9 "head clearer during 8; track 10 compared to 11 feeling like loss of pressure in an airplane"/bell or dizzy sensation; track 3 after 10 again: finally free and pleasant. This test person took an unusually large amount of time for the test. He or she pointed out that he or she had reacted by feeling bad one day before the weather upheaval (cf. reaction when comparing track 4 with 6). 100% accuracy. (6/28/02)

20) StGumb: Track 10 compared to 3 ("more pleasant") "feels warmer"; tingling in frontal sinus when comparing track 5 with 3; during track 6 the surroundings are warmer and unwellness compared with 8 and compared with track 3 (head is freer) during 8 sensation in head like burbling; track 11 immediately "warmer" and "skin sweaty" compared with 2 (more pleasant); during track 10 slight pressure, fairly unpleasant also regarding paranasal sinuses area/forehead area (here compared to 12); when comparing track 2 with 10, "agitation, sweating, warmth" was reported for the latter. Track 2 was then compared with 3; no difference was noted, but "fundamentally better than 10; when compared with track 3, 9 is more unpleasant, produces "agitation, pressure on the forehead" (3 "much better"). Comparing 9 with 10, both tracks produce unwellness (compare with track 3) and "head heavier", "pressure on paranasal sinuses". The test person complained about a cold. (7/9/02)

21) ThNeum: When comparing title 3 with 10, 3 was experienced as more relaxed, with easier breathing, less pressure. 9 produced tension on the skin ("pulls

itself tight"), which was also true for 9 when comparing track 5 with 9. "That is pleasant" was said about 8 compared to 5, whereby title 9 was then experienced as relaxing (*rarely takes the train); title 12 produced a greater feeling of pressure ("unpleasant") compared with 7 (*test person loves to ski and climb mountains.); during track 12, the pressure is very great and experienced as unpleasant compared with 3. Title 11 results in a report of "agitating/restless" compared with 4, for which the entire tension of the experiment up to then was gone (*[4]*Test person probably lives downtown; had been raised in the country). During track 6, circulation is felt compared with 2 and 3 (the latter two tracks are "more pleasant", compared also to title 7); during a retroactive anamnesis*[4]*, no meteorosensitivity was reported. (7/24/2002)

22) HaEisen: Title 3 makes breathing easier, compared with 9 and 11. The self-assessment of being insensitive to radiation was verified. During a retroactive anamnesis, the test person reported he or she was not sensitive to the weather, had no amalgam in his or her teeth and was raised in the country. (7/25/2002)

23) P-S (FrzFurtm): Compared to 9, title 3 was described as "lighter"; 3 was reported as "more pleasant" than 5; track 8 is "fresher, lighter, more neutral" than 10. The test was performed after a two-hour flight (the test person was tired). (8/2/2002)

Regarding the number of test persons and the numbering scheme, there is a discrepancy of 2, based on test person 5. This person actually consists of three test persons with identical reports. Later viewed statistically, these three persons were entered in the evaluation as one single person.

10.5. Overview of results of the questioning

Apparently, the goal of the **blind test with 29 persons** was achieved. This goal was to disclose differences between brief exposure to natural and technical electromagnetic alternating fields (in the ELF/VLF frequency range), by obtaining spontaneous reports of test persons' sensations. Following statistical evaluation of the logs, for 96% of the comparative tests a clear difference could be determined. These greatly varying comments could not be used directly or flatly for a telling statement. Therefore, a simple scoring system was devised. The purpose of the system is to show the **frequency of occurrence** of neutral, positive and negative descriptions in a very simple way. The system is based on a five-place scale, ranging from a report of subjective

- wellness "++" (> 80% report frequency),
- slight wellness "+" (> 50% report frequency),
- a neutral condition or alternating reports, to
- pronounced unwellness "--" (> 80% report frequency) and to
- tolerable unwellness "-" (> 50% report frequency).

The reports of this initial pilot **blind** study were summarized statistically. This resulted in the following **assessment** for specific fields/tracks:

- Title 3, Lake of Constance, formation of a high-pressure area "++"
- Title 2, La Palma, 50 Hz, nice weather "+"
- Title 7, Upper Bavaria, snow cover,

after passage of a cold front (earthquake) "+"

- Title 5, Aggressive warm weather in February, before a temperature drop of 20 degrees with snowstorm and lightning (February) "-"
- Title 6, foehn weather dissipated (in March) "-"
- Title 9, 30 meters from railroad tracks ($16^{2/3}$-Hz field) "--"
- Title 10, near a television and radio tower, technics/ELF/VLF signal mixture "--"

It is especially conspicuous that title 3 (with a statistical frequency of occurrence of 96%) produced positive comments, such as a pleasant, freeing feeling with coolness and good inhalation of air. In contrast, title presentations 9 and 10 caused feelings of pressure or similar reactions over the entire body, as well as warmth, etc. A tingling effect and agitation was often reported for tracks 5, 6, 9 and 10. As a rule, track 9 (with the emission of a railroad alternating field) felt unpleasant. The exception was test person 11, who enjoys traveling by train.

Chapter 11
Theoretical summaries for practical application of sferics in electro technical systems

11.1. Compilation of knowledge gained from the blind tests

Weather situations and the related sferics and technics were analyzed almost continually for months. This way, meteorotropical, biotropical and electroacustical analysis data was collected; this data is very valuable. This is true especially since no air-mass change runs counter to the clearly repeated, signal-theoretical meteorological relationships.

This relates to any kind of weather, such as thunderstorms, intermediate front, intermediate high-pressure areas and massive high- and low-pressure systems. What does this means? A varying group of persons provided repeated reports on the subjective effect of sferics recordings (cf. **Chapter 10.4**). These reports also show that broadband and/or uniformly intensive, aperiodical sferics bursts cause less stress for humans.

The biotropical effect on living beings on earth is negative under the following conditions:

- In the sferics burst spectra, the alternating-signal dynamics (not the averaged overall level) increases; the intensity of the broadband bursts varies (before and during thunderstorms), and/or
- With insignificant Omega signal components, a much smaller proportion of broadband burst discharges are present in the atmosphere.

In other words, people (and other creatures) are then troubled by headaches, tiredness, sleep disturbances, depression, etc. (cf. **Chapter 5**). These subjective reports provide fundamental knowledge for defining a pleasant "nice-weather field" in free nature.

Currently, the issue of whether such sferics alternating field intensities lie in the μV or mV range appears to be secondary. A certain, frequency-dependent level-dominant signal structure of the spectral components dependant on the signal time moment is of primary importance. The relatively broadband audio bursts are associated with a gurgling noise or tweeks, and last some ten milliseconds. The effect of these bursts at night is not precisely known at present (cf. Chapter 5).

However, it appears to be vital that those AIS in the specified sferics observation time frame in Central Europe occurred:

- during calm (nice) weather,
- mostly at oceans (the temperature does not change there as dramatically) with less extreme climates (temperature variations),
- as atmospheric discharges in the near field and
- more frequently in the summer than in the winter.

These sferics patterns (sferics discharges referred to above as "whistlers") presumably could have a relaxing effect on people, due to their low-frequency spectral components under 1 kHz.
Such long-term tonal discharges apparently take place continuously for some seconds, via paths in the cosmic vacuum (magnetic field lines of the earth). They have been measured in arctic regions (**Chapter 5** and **Figures 5.1, 5.2).**
With the above-mentioned, broadband gurgling bursts, the included, relatively high-intensity spectral frequency components at 13.5 to 14.5 kHz also appear to be important. These components are said to have a positive effect (**Chapter 3**).
The test persons' amazingly high level of sensitivity surprised even the leader of the experiment. Many test persons "voluntarily" described specific titles in a similar way, including metaphors.
The following, preliminary hypotheses are based on the notes of these descriptions:

- Although the track contents were not revealed (the test persons were not told the track number) during the blind tests the test persons seemed to be able to associate physical-psychological parameters with each sferics and technics signal.

In other words, people seem to store various field patterns with certain electromagnetic wellness patterns in their memory for many years. They seem to associate these field patterns with e.g. biotropical weather situations or with how they felt during these situations. This is similar to the way people recognize the acoustical timbre of the sound of an instrument.

Immediately after the test, the test persons were asked a series of questions (so-called brief anamnesis) about their past. Events were revealed involving, for instance, physical/mental trauma. From the viewpoint of this work, these events coincided with a specific evident field (track numbers/track contents).
"Negative" comments or collected sensitivity descriptions agreed with the presented field contents. Here are some examples, which supplement the above-mentioned hypotheses:

- Test person no. 2 had manned a trade show booth for several days, and had driven his car for seven hours. He spontaneously volunteered to participate in the test; he was sleepy, with a headache, neck ache and general pains. In addition, he is a chain smoker (heavy smoker) and uses a mobile telephone a great deal. Amazingly, title 3 appeared to greatly reduce the perceived resulting health problems within 5 to 10 seconds. This case was described retroactively and discussed with a family physician **[50]**. The problem was diagnosed as an open blood-brain barrier, which was later closed with the described irradiation with track 3 alternating fields.
- In general, special attention should be payed to test persons 2, 4*, 6**, 19***. They provided quick, highly precise reports in metaphors for the **blind pilot** test. The reason for this has to do with their work/profession (meteorology**) as well as considerable electro-sensitivity* and meteorosensitivity ***.

- Those who use mobile telephones a great deal (test persons 7 and 8) and computer geeks perceive the related signal as less unpleasant and "warm". I.e., the subjective reaction is influenced by one's work or general attitude about a situation or preferences. An example is uncomfortableness regarding "elevated tracks/train rides (track 9). Test persons 7, 8 and 9 commented negatively on these reports.
- The inverse of this is test person 11, who describes track 9 as creating pressure but "pleasant". (This person enjoys riding on trains, as described in **Chapter 10.5.** above.)
- During an anamnesis on the past of the test persons, it was especially significant that test person 8 had lived near a high-voltage power line (track 2 with 50-Hz hum was less pleasant than track 3). Test person 9 reported pressure on the thyroid gland (track 10), which is remarkable and should be examined.
- Test person 4 is highly "electro-sensitive" to electro smog and earth radiation.
- Test person 5 is a weather analyst and could associate the sferics tracks with weather situations and wellness with 100% accuracy. Also, he or she was greatly affected by technics. I.e., the person's earlier work provided much information. He or she was able to mentally associate specific fields with real situations. These mental associations are highly significant in his or her description of the effect of the alternating field on each track.
- Test person 19 mentioned that one day before the weather upheaval he or she had reacted demonstratably with constitutional disturbances. A number of people in the town were witnesses of this. This affected the notes on tracks 4 and 6.

- Test person 20 had constitutional disturbances (twinging, aching) of the frontal sinus, caused by a cold on the day of the anamnesis. He also recalled problems with meteorosensitivity during foehn (and associated bone problems) when he was between 12 and 16 years old. During the alternating field titles 5, 6, 9, and 10, "subjective warming effects" and the mentioned frontal sinus problems were noteworthy.

The results of this study (blind experiments without structured answers for the test persons) show clearly that there certainly are differences in people's wellness when they are exposed to varying, electrical field spectra. In contrast, **[34]** states that **electro-sensitivity** cannot be recognized as such.

In particular, there is a difference between:

- "negatively" perceived technics, combined in numerous ways (track 19, Chapter 10.2) and
- sferics with a very "positive" effect (track 3), during formation of a stable high-pressure area in undisturbed nature.

At this point, it is appropriate to refer back to the spectral properties or structures of nice-weather sferics discussed in **Chapter 9**, with broadband spectral components and especially high AIS levels in the frequencies between 13 and around 14 kHz. There is a direct connection here to the above-mentioned broadcast radio transmission of the "happiness frequency drug" (cf. **Chapter 3**) in the same frequency range.

Inversely, signal levels in this frequency range were low during measured and analyzed phases of bad weather. At 12/12.5 and 15 kHz, Omega signals dominate. This would allow a causal relationship between the alternating signals of nice-weather sferics (perceived in the study as especially positive) and the sensation of feeling well in high-pressure areas.

These tests also underscore the phenomenon of meteorosensitivity and earthquake sensitivity in the described A-B comparisons, for normal test or field conditions in a building.

Does the existence of artificial alternating fields enhance the perceptual sensitivity for poor weather? Does their existence increase the feeling of unwellness during weather upheavals (meteorosensitivity)? These issues cannot and should not be definitively clarified here.

Of course these studies should be continued, in order to further ensure the statistical significance of the results. The test conditions could be altered or other test persons could be used. Although the experiment was performed with a relatively large number of test persons, nothing has been proven conclusively. It cannot be claimed that the addressed facts have been conclusively verified.

For this epidemiological pilot study, the following must be emphasized: The experimental arrangement for this pilot blind study was not isolated, i.e., electromagnetically unshielded. The arrangement included recorded artificial and natural electromagnetic fields.

Apparently, this experimental arrangement sufficed to preliminarily demonstrate electromagnetic sensitivity (electro-sensitivity, meteorosensitivity), on the basis of comparisons. This conclusion is based on the experience that most test persons recognized or felt the spectral information contained in the signals.

In other words: In the human memory, abstract contents and experiences apparently are stored in an analyzed form. Examples are a person's liking or disliking for specific situations, including the related alternating-field information. Smells and sounds are stored in the same way. Based on experiments involving animals and people, BECKER [7] states that people are capable of analyzing alternating fields, and do so in a manner which is not entirely involuntary.

11.2 A system-theoretical error in technical alternating signals from a biological point-of-view: Transferring signal continuity from time to frequency

The knowledge gained above from the studies of this work as well as well-known decades-old research findings (such as BECKER **[7]** and TESLA **[8]**) refer repeatedly to nature and its electricity in living beings.
Hence, it is plausible to orient oneself according to nature and to modify current transmission techniques in communication and energy technology. The following are two examples:

- The frequency of generated and transmitted electrical energy (DC with considerable losses) could possibly be corrected to a multiple of the Schumann resonance frequency harmonics (example: f = 7.8 Hz * 6 = 46.8 Hz compared with the European power line frequency of 50 Hz; **[1]**). Additionally, the power grid frequency could be varied by at least some millihertz, based on the Schumann wave frequency to be sampled. Or the sinusoidal wave shape of the entire power grid could be modified in accordance with signal theory. It should be changed to a nonsinusoidal-periodical stochastic or signal function. In particular, it should be made to resemble the natural VLF-ELF spectrum. In accordance with the above discussion, biosystem synchronization **[26]** would be avoided with this function.
- Communication technologies work with continuous spectral intensities over the **time** axis for certain frequencies. Examples are analog and forthcoming digital broadcast radio/television as well as GSM or DECT mobile radio, which pulse the voice packets at 217 Hz/100 Hz. This is shown in the 3-D spectrograms shown above (**Figures 10.2.11** and **10.2.12** as well as **Chapter 9.4**).

In contrast, atmospheric ELF/VLF alternating signals are time-variable and **frequency**-continuous, with regard to "pleasant and healthful" broadband bursts. In other words: The system-theoretical continuum of nature uses the frequency. However, transmission technologies developed by humans mostly use time. Thus, the frequency/time axes are switched.

This biologically relevant information **[7, 26]** should play a major role in the development of artificial electrical systems. This is especially true since the currents of our nervous impulses lie in the pico- to nanoampere` range. And on the other hand, "sensitive" PC monitors at workplaces near railroad tracks "fidget around" at a frequency of $16^{2/3}$ Hz. (This is comparable to how a magnetic field deflects the electrons in a cathode-ray tube.)

Finally, in southern Germany it was determined repeatedly that current-generation computers (featuring GHz microprocessors) can crash when the weather is aggressive **(Figures 10.2.5** and **10.2.6** as well as **Chapter 9.1)**. These computers can possibly react in an unfavorable resonant manner to atmospheric or technical burst signals.

11.3. DC supply power in human settings

For evolutionary reasons, people apparently have not yet adapted to artificial evident fields (technics) to which they and animals are exposed. How can these fields be reduced or altered, in a manner compliant with natural circumstances? This chapter is intended to be a supplementary note on these considerations.
In one way or another, most processes in industrial societies have to do with electrically operated systems which work on the basis of DC or AC power. Almost all of these systems are controlled by switching elements and microelectronic elements requiring DC power in order to function. (Examples are hifi amplifiers and microprocessors.) The AC line voltage (110 V/60 Hz or 230 V/50 Hz) is converted before it is fed to the device as DC.
Power supplies located where people live and work typically have short power leads (in order to minimize the dissipative or transfer resistance). Such power supplies could be converted to DC technology (e.g. light), including the DC magnetic field which is generated. This would be in harmony with the earth's magnetic fields, to which living beings have adapted for millions of years.
As a matter of principle, this insight is not new. Additionally, such electro technical systems would be better for human health. This conclusion is based on the work of BECKER [7], who demonstrated that nervous impulses and information are transferred on the basis of DC voltages.

11.4. Optimizing magnetic field therapy: time variance in the ELF/VLF bursts

As described in **Chapter 3**, numerous experiments involving artificially generated electronic pulses were performed in the 1960s and 1970s **[6, 21]**. However, as this work describes, it is now known that time-variant broadband lightning discharges with a main energy spectral component in the ELF/VLF frequency range have a biologically harmonizing effect on humans. It is further known that certain bursts with favorable natural frequencies have a weather-related effect (cf. "happiness drug" **[22]**).

It is probably also conceivable and biologically meaningful to deperiodize or enhance magnetic field or magnetic pulse therapy. This could be done based on either:

- a slightly or increasingly fluctuating *[5]*pulse edge behavior and pulse time behavior, with a related broadband spectrum (10-Hz pulse for enhanced mental concentration, with positive and negative amplitude, in accordance with the first and second sine half wave in the *[5]*phase range of ± 180 degree; **Figure 10.2.8**), or
- mixing these broadband pulses with pulses at (level-) dominant frequencies between e.g. 13.5 and 14.5 kHz **[22]** and/or
- beating/modulating either or both of these pulse waveforms onto a component, which would be either similar to a sine/sawtooth/squarewave function, or stochastically time-variable.

The center frequency would be 10 Hz, in accordance with the above example. The deviation would vary statistically in accordance with the modulation, within a range of, e.g. less than ± 2 Hz. This can be based on sampling time signal fragments of a recorded, natural sferics. Otherwise, synthetically regenerated partial bursts based on the natural spectral behavior of (nice) weather fields can be used. The goal is to create a time- and frequency-variant overall burst structure.

There is an advantage to composing sferics in this manner, rather than generating entirely synthetic pulses (as has been done in the past, with 10-Hz technics). The signal technology is based on the signal frequency information present in the atmosphere, with a stochastic time distribution. In particular, this would comply with a nice-weather field having a relaxing effect. Use of other fundamental frequencies is conceivable instead of 10 Hz, such as between 1.4 Hz (relaxation) and say 24.2 Hz (fitness) (also variable as modulation/beat).

11.5. Exposure to therapeutic sferics alternating signals in rooms, transportation means and head-held sound systems

A fundamental idea is to be able to reproduce recorded and stored natural sferics at any desired moment. Another application of this idea is to mix natural and artificial radiation, consisting of nice-weather AIS and the technics. This artificial exposure should have a field intensity similar to that of the recorded and stored natural sferics.

This could be done, for instance, in the interiors of motor vehicles, passenger aircraft or in conjunction with the use of a computer, including the monitor, as well as during exposure to music and voice by means of headphones or headsets (**[51]**; cf. **Figure 11.5.1.**).

Measures would be required to counteract the electromagnetic fields generated by such active devices and loads. For one thing, the devices could be shielded, totally enclosed or sealed. A modern technique for this involves using so-called MU metal, a magnetically extremely conductive metal (permeability = 80,000; air = 1) (cf. **Chapter 2.1**). At the side directed to the biosystem, (e.g. the human head, in the case of headphones), an device would be added for reproducing the sferics field.

The above has outlined a technique for radiating nice-weather sferics in a technical ambience created by humankind. Application of this technique to animals and plants living in nature is conceivable, and should be attempted.

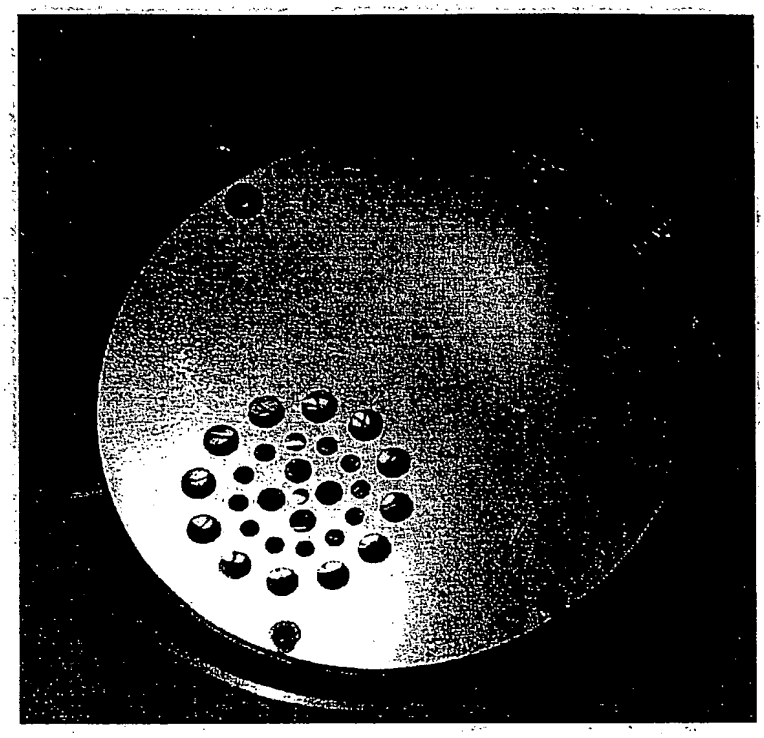


Figure 11.5.1: View of a type HFI-2000 low-radiation headphone manufactured by ULTRASONE.
This headphone is equipped with magnetically highly shielding material known as MU metal. The sound openings in front of the acoustical driver are cut out by a laser beam to a precision of 0.1 mm, to avoid distortion of the sound impression.

11.6. Ideas on how to reduce the biological effectiveness of pulsed, electromagnetic mobile radio radiation or fields on the basis of quasi time-variant sferics spectra

11.6.1. Outline of the basic problem

The transmission of mobile radio signals is the subject of frequent, controversial discussions. These signals are based on so-called pulsed extremely high frequency signal packets. They use a carrier signal (900 MHz, 1,800 MHz etc.; cf. **Figure 10.2.11**) to enable a bilateral exchange of encoded voice sequences, among other things.

These artificial electromagnetic signals are generated by a mobile telephone or transponder/transmission and reception unit. They are emitted and received in a rhythm of e.g. 217 Hz (for GSM) or 100 Hz (for DECT).

This contrasts with the phenomena of air electricity (known for at least the last 100 years) and lowest-frequency magnetic fields spanning the globe (DC and alternating fields in the ULF/VLF and ELF/VLF range; cf. **Chapters 2** to **4**).

At this point, it is relevant to refer to the standardization of so-called **SAR values** (**Specific Absorption Rate**). These values are established on the basis of a humanoid dummy filled with liquid. They provide the basis for discussions of the thermal effect of high-frequency signals used by mobile telephones.

The following procedure is commonly used, in order to reduce evident fields which are too strong. Mobile telephones can be equipped with a MU metal cover, in order to influences its antenna directional characteristics. An example is the chrome-plating of the inner shells **[52]**.

Recently, comparative measurements were made with a special kind of shielding **[53]**. So-called MU metal was placed on the keypad side of a recent-model mobile telephone (cf. **Chapter 2.1** and **Figure 11.6.1.1**). According to system theory, the low-frequency component (217-Hz signal component) is actually present in the modulation. This low-frequency component was also measured, separate from the GHz carrier. AF magnetic field measurements included this AF component.

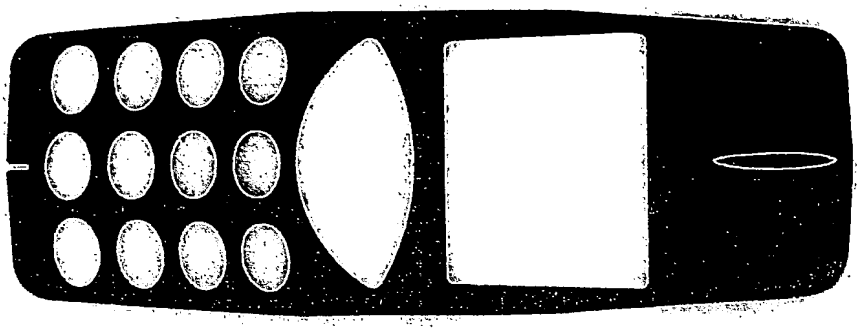


Figure 11.6.1.1: View of a housing surface add-on element for a mobile telephone, made of so-called MU metal (manufacturer: Nokia, type 3110).
It is used in particular to shield low- and high-frequency signal components, which mobile phones radiate to the operator's head. Hence, the MU metal reduces these signal components.

The following **SAR values** were obtained:

- "Integration to 10 grams of mass" >> SAR = 0.2 (cf. without MU metal, SAR = 0.84)
- "Integration to 1 grams of mass " >> SAR = 0.3 (cf. without MU metal, SAR = 1.2)

Why does the mobile telephone with MU metal radiate much less in the AF and HF frequency ranges? The reasons are currently being investigated. Reflection, absorption and eddy current effects may be involved. This could be tested in future simulations of shielding.
The magnetic field measurement also showed that the MU metal insert lowered the low- frequency component (the 217-Hz Gaussian envelope) between 75% and 80%.

The signal's AF component was modulated in with the GHz carrier, so this reduction also affected the HF component.
This work deals with the effects of natural signal structures. The public discussion of the thermal effects of mobile radio radiation does not consider the essential biological foundations of these effects. Viewed from the point of view of system theory and in accordance with **Chapter 11.2**, these foundations most likely are to be found in the problem of the currently still swapped "frequency/time continuity". This means that the signals should follow a periodical pattern, rather than aperiodical or stochastic patterns.

11.6.2. Description of the procedure

The biophysical effect of mobile radio alternating signals is widely discussed in public debate. The communications engineering/system-theoretical considerations mentioned above are significant in this regard. These discussions ignore the second component of the broadband mobile radio signal, namely the **low-frequency** Gaussian envelope. (Compare 217-Hz signal pulse packets modulated with the GHz carrier; cf. **Figures 10.2.11** and **11.6.2.1**.).

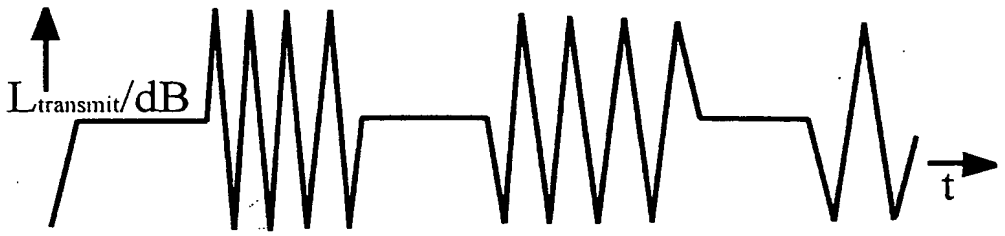


Figure 11.6.2.1: Schematic rectangular time curve of an otherwise Gaussian-shaped 217-Hz pulsing emitted by GSM mobile telephone signals (German D1/D2 net).

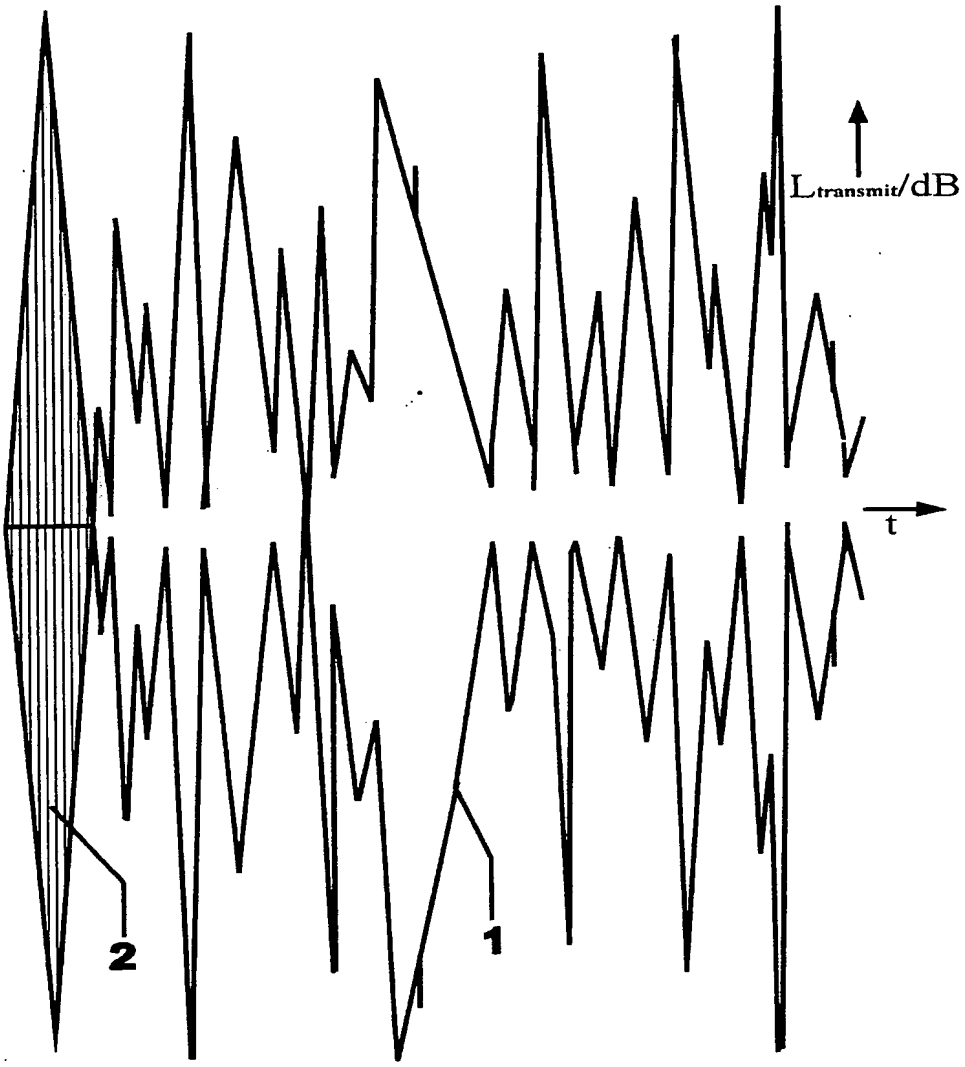


Figure 11.6.2.2: Schematic time curve of the time-variant signal of a sferics envelope (1) for use instead of e.g. the Gaussian-shaped 217-Hz pulsing based on the GSM mobile radio standard, as shown in **Figure 11.6.2.2** (could possibly also be used as a UMTS envelope).
The hatched initial area to the left indicates the enveloped high-frequency carrier (2).

It is conceivable that this envelope affects living beings or interacts with them. This is described an in overview of research results starting in **Chapters 2.1** and **11.2**. In any case, these possible interactions or effects cannot be categorically viewed as unproblematic.

These considerations also apply to the house telephone standard DECT, the new UMTS technology or to broadcast radio/television signals supplied via Digital Audio Broadcasting (DAB), etc. Therefore, a procedure will be suggested here **[9]** which deals with the field emissions of mobile radio transmitters, transponders, etc.:

As a matter of principle, these DECT/GSM/UMTS transmission and reception systems are half of the total communications system for many mobile telephone users. These systems convey the location of mobile telephone users. They receive the sent voice signal sequences or transfer the sequences to a mobile telephone. Hence, locally many telephone calls flow digitally through these systems in 217-Hz pulse packet mode at various times. These signals, in turn, behave periodically relative to the stochastic sferics. This is a problem which probably has biophysical effects.

The following technique is suggested, to counteract this problem prophylactically.

Either:

- The pulse packet pauses (cf. **Figure 11.6.2.2**: "horizontal line" between the sine/sawtooth signal sequences) should be filled and hidden with sferics spectral time curves; or
- Preferably, the levels of mobile radio signals should be enveloped with sferics fields.

This means that mobile radio signals should conform with the stochastic (nonperiodical) frequency/time-dependent structures of the sferics.

It would not be very difficult to add AF antennas, etc., to the existing transmission facilities. In addition or as an alternative, with computer support sferics could be transmitted during the signal pauses. This could also be done with mobile telephones, in this case of course using less power. In both small/large applications, it would not be necessary to modify the fundamental, digital signal patterns (additive UMTS/DECT/GSM signal radiation plus sferics/Schumann wave signal radiation).

With DECT house telephones, this can be put into practice quickly, in a much simpler, standardized manner. Here, independent transmitters and receivers (not networked) are used in a relatively small area.

With the suggested procedure, the sferics signal should consist of typical, natural burst spectral curves of a nice-weather field (cf. **Figure 10.2.3**). This field would be transmitted in periods greater than e.g. 20 seconds. It would be repeated in a quasi time-variant manner. The procedure would sample this real-time spectrum in advance.

At the mobile radio signal reception system, the known sferics envelope of the frame (more than 20 seconds) would probably make it easier to reconstruct lost mobile radio data (known patterns would be recognized during the current real-time signal).

This procedure would also be applied to mobile telephones. The bandwidth of known UMTS signal transmission patterns is greater than that of GSM. Due to this and their main spectrum intensity, these transmission patterns could possibly be a kind of synthetic forerunner to quasi naturally-variant alternating signal time spectra.

If possible, the suggested procedural steps should prophylactically "reproduce" the character of the natural, spectral evident field. Or these steps should hide technical/artificial, electromagnetic fields to the greatest extent possible. The following examples confirm that this approach is promising:

- A study of the literature **[25]** on 36 years of Russian research on electromagnetic fields. In particular, sensitivity and numerous findings were collected there.
- De facto, some large corporations are increasingly interested in technology for reducing the effects of biological fields, as discussed here **[52]**. This is no longer categorically dismissed as an "esoteric idea". Some of these corporations are known to the author, and can be accessed via him.

The technique outlined here has a local electrophysical effect extending around some 100 meters. The propagation of the weather radiation waves covers an area of hundreds of kilometers. Ultimately, this technique has no meteorotropical influence on the latter distance.

11.7. Reception of sferics weather signals as a way of supplementing precipitation radar

The geographical location of bad weather with severe turbulence (including thunderstorms in particular) can be determined to 1 km, by means of thunderstorm activity **[53]**. Hardware solutions have demonstrated this for years.

The existing data has been gathered and studied by Baumer, et al. **[3]**. As a matter of principle, it should be possible to use this data to forecast or at least to locate hurricanes, tornados, etc., in the U.S. This is a reasonable assumption, in particular because, before these developing events occur, local increases of the ELF/VLF field intensity and signal dynamics can be expected in the rising eddies. This occurs in addition to visible lightning **[36]**.

After some local measurements of normal and special weather situations, it should be possible to quickly establish correlations between specific conspicuous sferics alternating signals and the measured tornados. At any time and independent of location, reports and analyses could be made quickly with the procedure described above (including the portable measurement and analysis equipment). This is an additional argument for studying tornados.

Compared with precipitation radar, measuring and analyzing these sferics according to Baumer **[3]** would reveal more details of the weather situation, even in advance. This would also tend to filter out EHF radar beams (in the GHz range), especially in the time frame of the observation. Hence, fewer technics would be generated.

11.8. Planned studies

A further study should be carried, to substantiate the pilot blind study described in **Chapter 10**. This study should use animals. Clearly, they cannot be influenced "telepathically", so animal studies are comparable with double-blind experiments involving humans.

Such studies might be quite significant. For instance, cattle in pastures or stalls near transmission towers appear to exhibit more health abnormalities **[27]**.

This is probably due to the relatively large ("antenna") body dimensions of cows. They act as a fairly effective reception antenna for technical, electromagnetic evident fields. Hence, it must be assumed that periodical (low-frequency) alternating signals affect nerves or cells, as described in **[7, 26]**.

Relief from such technics irradiation is conceivable, by lowering biochemical reactions. One possibility would be to reproduce sferics signals whose field intensity is adapted in a meaningful way. This must be verified at affected farms. Nice-weather sferics could deperiodize signals. They could also make it possible to keep animals in a relatively animal-friendly fashion, without radiation irritation. As has often been noted, generally speaking animals react sensitively to atmospheric and geophysical stimuli. An example is the behavior of animals before earthquakes **[47, 54]**. Nice-weather sferics could address this sensitivity.

Such sferics transmitters could be portable devices or permanently installed in the stalls. The decision for one version or the other would probably be made on a case-by-case basis.

Obviously, additional study is required of the effects of artificial sferics radiation on humans and animals. (The Prognos® test is discussed in the Appendix.)

Chapter 12
Discussion

12.1. Analysis technique

A pilot **blind** study analyzed specific spectra of horizontal sferics activities and observed the effects of these spectra on humans. (See the above chapters for a thorough discussion.) This analysis underscores the great significance of atmospheric-electric alternating signals characteristic of certain weather situations, as described by Baumer and Sönning **[3, 29]**.

Until now, the statistical existence (or frequency of appearance) of horizontally and vertically propagated sferics was examined, in conjunction with the (expected) weather situation. In contrast, the studies described in this work focus on the temporal level behavior during the sferics analyses.

The obtained results complement the earlier reports mentioned above **[30, 31, 32, 33].** This becomes apparent, based on the following major statements concerning the measurements:

- In these studies, for normal weather situations the results or knowledge is limited to the frequency range above 1 kHz. Increased spectra were measured and integrated over time between 7 and 15 kHz.
- Depending on the weather situation, in the frequencies around 4, 6, 8, 10, 12, 14 kHz the discharge burst walls demonstrate increases or one to several intensity peaks. In accordance with **Chapter 4,** Baumer and Sönning **[3, 29]** designate this as frequency bands. In **[3, 29]**, these bands are described as having frequencies identical to those in this work. In accordance with **[3, 29]**, the frequency bands 28 and 50 kHz could not be received during this work, because the upper limit frequency of the measurement equipment was 20 kHz. These frequency bands would be important primarily for bad weather situations, with turbulence/updrafts of warm air. Based on the literature **[30, 31, 32, 33]**, it is plausible to conclude that these frequency bands are irrelevant with regard to recording and storing nice-weather sferics.

The general question arises: Is the desired technique correct or reproducible? It is reasonable to assume that the frequency response of the recording is not influenced.

There are the following reasons for this assumption:

- derivations and calculation of the related sferics wavelengths (some ten kilometers), as mentioned above; and
- the measurement antenna signal is picked up during a no-load condition. The measurement antenna elements are mounted vertically in the ground.

This was checked, using grounded antenna elements having lengths of 1.5, 2 and 3 m. During this check, only a change of the overall level (2-D composite spectrum analysis) could be detected.

Further, there was no significant indication that the recording equipment distorts the frequency response. The manufacturer certified that the input signals are recorded with linear amplitude and low distortion (< 0.1%) from 20 Hz to 20,000 Hz ± 0.5 dB. The plausibility of this work (including numerous 3-D spectrograms) is shown alone by the statistical significance of the test persons' reports on their wellbeing as well as the above-mentioned literature comparisons. This reproducibility also applies for the thesis of the (not entirely substantiated) reports on predicting earthquakes by means of detecting sferics/technics abnormalities in the ULF frequency range (this also correlates with the sensitivity for imminent earthquakes).

Sections were cut out of sferics signals stored in a long audio signal file. This was repeated several times, producing slight modifications in the spectrograms mentioned above. These changes indicate that the data was processed, and the graphics are shown, in high resolution. However, in these spectrum analyses conspicuous sferics peaks or troughs could always be recognized according to scale.

Another critical question concerns the graphical display. This question is important, especially since linear scales were chosen for the frequency and time axes; this was intentional. The reason for this choice is two-fold:

- as is well known, major frequency time analysis moments of the sferics [3] are to be found starting at some kHz and higher; additionally,

- effects specific to certain weather situations are best displayed graphically with a linear display of the signal levels (cf. **Figures 12.1.1./12.1.1a, 12.1.2/12.1.2a**). The linear form was especially helpful for displaying the ULF abnormalities of earthquakes.

12.2. The biophysical context of the results

It is often doubted that humans are **sensitive** to natural evident fields – with or without synthetic or technical alternating fields, in shielded rooms or in unspoiled nature. These observations provide arguments supportive of this sensitivity. When the weather is normal, the levels of the examined sferics are powers of ten lower than the typical technics in residential and developed areas (cf. **Chapter 10.3**). **Chapter 12.2** below will provide further arguments which support this sensitivity. The numerous results of the study described in **Chapters 2** through **5** reveal a key phenomena which can best be designated as effective, or active, windows **[1, 6, 7]**. With these effective windows, e.g. nervous transfer of information or certain organs respond, depending on the frequency. Or "artificial effects" are produced, such as enhanced concentration, nausea, feelings of happiness, etc.
These effective windows lie in the ULF, ELF and VLF frequency ranges (from some millihertz to X kilohertz). Precisely in these frequency ranges, humans radiate narrow-band long-term signals, permanent signals, pulse packet signals and short-term signals into the atmosphere. Significant technics frequencies in these ranges include 16 $^{2}/_{3}$ Hz (railroad system), 50 Hz (line power), 100 Hz as well as 217 Hz (wireless telephony), X-kHz (UMTS mobile radio), 12 kHz, 15 kHz, 16 kHz and 18 kHz (Omega signals/television line signals/telegraphy), etc.

Broadband technics ("broadband" with regard to both field intensity and intensity) do **not** completely mask these entire ULF/ELF/VLF frequency ranges. Rather, sufficient frequency spectrum remains for biophysical effective "loopholes".
This is remarkable, especially since everywhere the sferics radiation is "masked" several factors by technics. Despite this, these sferics can cause many different constitutional effects. This is related to their signal structure and highly dynamic existence (ranging to greater than 140 dBu, cf. quiet weather and thunderstorms). Over millions of years, the reception system of living beings on earth (such as humans) has been genetically fine-tuned. It is highly sensitively tuned to tiny field differences in the sferics frequency ranges. Human meteorosensitivity (thoroughly documented in **Chapter 4**), especially in offices or at home, attests to this. Here, technics at 50 Hz, 217 Hz, 16 kHz, 18 kHz and further frequencies overpower the signal levels of the sferics.
However, if highly dynamically (> 140 dB) recorded electromagnetic alternating fields were digitally filtered out with steep edges, then these sferics signals would reappear during signal analysis. (They are somewhat attenuated by exterior walls, etc.) In the spectrograms mentioned above, these sferics signals would become "technically" visible. Apparently, these sferics signals would then also have an effect on living beings.
Such sferics bursts are shown in **Chapter 9.6** and the graphics presented there. These bursts are weaker than the technics; the difference is around 40 dB.
This becomes evident during the following circumstances:

- low-frequency magnetic and electrical fields are measured within enclosed buildings
- brief, nonperiodical variations are shown on the intensity scale

- as a thunderstorm is forming, sferics activities gain strength (such as lightning which is not seen).

The recording technique described in **Chapter 6** converts these background sferics into acoustic signals.

Finally, two issues should be stressed:

- This study did not compare the effects of the 50-Hz and 60-Hz line voltage frequencies employed in European and U.S. power grids. It did not attempt to determine if one of these frequencies has more or less effect on living beings. This is in agreement with the objective of this work. The above-mentioned 60-Hz evident field is the third harmonic of the of the 20-Hz Schumann resonant wave. Presumably, it causes fewer effects than the 50-Hz grid.
- The technics at 12 and 15 kHz are extremely useful for graphically evaluating weather conditions. (The existence of Omega signals indicates unfavorable or poor weather.) Of course, these technics must be filtered out whenever required. Examples are therapeutic or epidemiological test applications. On the other hand, in this **Chapter 12.2** the phenomenon of **(electro-) sensitivity or meteorosensitivity** is now verified a **second** time by the following hypothesis (cf. controversies between **[28 -34]**): Around 60 years ago, there were no synthetic, permanent alternating magnetic fields (such as Omega signals). Today, there are technics. Electromagnetic measurements pick up a mixture of the technics and sferics. This work clearly documents that these technics dominate during certain weather situations (are stronger than the sferics). Hence, in past decades people presumably suffered less from meteorotropically unfavorable atmospheric conditions. (An example is foehn in Southern Bavaria, etc.)

12.3. Contents of the epidemiological interrogation – pilot blind study

Regarding how the pilot **blind** experiments (study) was approached and regarding the quality of the reports, the following should be noted. There was no intention to use these reports to prove statements of great statistical significance. Rather, this study does not reject the notion of electrosensitivity and meteorosensitivity, at least not categorically. Electrosensitivity and meteorosensitivity are often categorically rejected and dismissed.

On the contrary, it appears possible to state that "Nice weather is biologically more agreeable or more pleasant, technics is not" with a degree of certainty that extends beyond the realm of coincidence.

The following signals were directly compared, without suggestive comments:

- nice-weather sferics

and

- technics field mixtures taken from the railroad system or a radio tower (TV, radio, mobile telephone, etc.)

In a period of some ten seconds, these signals were mixed with other recorded, real, electromagnetic field combinations.

This matches the described EMC laboratory conditions for the experiments:

- no technics shielding;
- a mixture of signals (whose level depended on the weather), consisting of real-time weather-situation sferics (different each day) and
- local technics (laboratory equipment, 50-Hz line power, mobile radio transmitter 600 m away, etc.) and
- sferics/technics artificially added or reproduced in the pilot blind study, in accordance with **Chapters 10.2** and **10.3.**

Based on earlier work, such as **[34]**, there is no reason to expect a statistically significant result from the current study. The anonymous test persons would be willing to confirm at any time that the **blind** experiments of the current study were performed correctly.

Fundamentally, it would be meaningful to continue this study, and to repeat it with different experimental conditions. It would also be meaningful to determine what reports are created when test persons are exposed to sferics and technics and then asked to describe how they feel, in a laboratory with broadband shielding over all major frequency ranges.

If this were carried out as double-**blind** experiments, then the results would be irrefutable (considering the meaning of the concept of pilot blind experiment). This would decide the following issue, among others: Is it permissible to use portable equipment which reproduces nice-weather fields or mobile radio applications (cf. **Chapters 11.5, 11.6**) therapeutically, to permanently irradiate living beings with sferics fields or with time- periodical or time-limited sferics? Application examples were mentioned above.

The knowledge described here allows a further logical conclusion or presumption (cf. **Chapter 3**) regarding the publicized information **[22]** on a so-called happiness frequency drug: While playing FM music, the radio station r.s.2 transmitted a modulated alternating signal mixture, with frequency components between 13.5 and 14.5 kHz. Theoretically, that is between the relatively stimulating (or aggressive) technics frequencies 12 to 12.5 kHz and the (depressive or) relatively relaxing technics frequency of 15 kHz. If the feelings or concepts "stimulating" were mixed with "relaxing", then there might be a certain relationship to the feeling of happiness.

12.4. Predicting earthquakes

The knowledge gained in the study leads to an unexpected result. It is reasonable to expect that earthquakes can be **predicted**, and that their locations can be determined **before** they occur. Sferics and technics signals would be used for this; sophisticated measurement equipment is not required. This is quite sensational. Atmospheric sferics/technics alternating signal recordings would contribute to this. The recording process should be an ongoing project, if possible. These recordings should include abnormalities which are observed in the ULF frequency range when an earthquake occurs. It is to be expected that the recordings would provide superior statistical support for the proposed model.

There exist simple procedures for detecting earthquakes before they occur. It is possible to calculate the location of the epicenter and the distance to it. By itself,

this should be sufficient motivation for pursuing this method of epicenter location. It would be best to have several networked measurement stations at various locations. (The distance between these locations should exceed 1,000 km.) Further, it is known that the earth's atmosphere emits ULF information typical for specific situations. This is due to the ferrous earth, which can shift **[46]**.

12.5. Optimizing technics-generating procedures

Suggestions were made above regarding how technical processes of our industrial civilization can be improved, on the basis of sferics activities. The question is if these suggestions will be accepted (or tested benevolently). With this work, proposals can probably be generated for reducing impairments to health and feeling good which are caused still existing but obsolete design principles for electronic devices. Technical procedures are suggested (not the first time in the Industrial Age) based on concern for (electrical-) biological and human forms of life. In the future, these suggestions should not be rejected categorically. In particular, they should not be rejected for economical reasons.
In the near future, one question will presumably remain unanswered. Are the already infringed upon, natural biological effective frequency windows indeed "masked" by such technical optimizing modifications to common telecommunications techniques (stochastic sferics signal structure as an envelope). The results of the short-time blind experiments (cf. **Chapter 11)** affirm this. These experiments demonstrated the following: By artificially reproducing sferics and technics, technical alternating fields do appear to have a spontaneous, positive masking effect.

It will have to be determined if living beings should be exposed to these positive sferics fields permanently or for limited time periods.

The difference between:

- radiation added to the surroundings, such as nice-weather radiation and
- the above-mentioned sferics envelope, instead of e.g. a 217-Hz Gaussian function, for mobile radio applications

must be determined in terms of telecommunications engineering and system theory.

However, from the viewpoint of the biophysical approach being used, these new techniques are seen as being true to nature. Hence, they should either improve the well-being of persons exposed to mobile radio radiation, or not deteriorate their well-being.

In this context, the swapped components should receive special attention.

Telecommunications signals have always been continuous in the **time** domain (periodicity plus the harmonics similar to several parallel permanent tones). For these purposes, however, it is the desired **frequency** domain which should be continuous (meaning continuity in the spectral curves of broadband pulses). This would be in harmony with the system-theoretical structure of natural signals.

These spectral-variant transmission techniques might save transmission energy. In addition, they take consideration of the body's electromagnetic DC and AC signal processes [7]. These stochastic signal processes have evolved over billions of years.

This work should not or will not restart the discussion of limit values for technical low-frequency and high-frequency fields. Here, the emphasis is on the signal-theoretical relationships (3-D spectrum analysis).

Further, the differences in the levels of normal weather AIS in accordance with [3] and of thunderbolts (powers of ten) should be recalled. In a sense, this is a counterargument to the discussion of limit values, which is based on thermal effects [55]. In actual practice, people who are exposed to high currents on the job, for instance, still sense changes in the weather. Again, the biological effect of varied low-frequency field modulation techniques, embedded in high-frequency signal components, should be studied.

Chapter 13
Conclusion - Outlook

From the very beginning, this work dealt with a fundamental problem:
The objective was stated as follows:

- To record natural, atmospheric, electromagnetic discharges;
- Based on numerous recordings, to then select those sferics signals which are defined as having a favorable effect on living beings, and which hence are suitable for therapeutic applications.

The result was a large body of new knowledge. Subsequent further research activities will be described below.

Hence, the context presented here is a limited collection of facts, indicative of that point in time during which the work was performed.

While the measurements were being made, new knowledge was added to the overall result on a nearly daily basis. It is desired to highlight that the body of scientific knowledge presented here is an open-ended process. The following is a summary of the especially spectacular projects and studies which should be performed but could not be worked on in the given time frame:

- A sferics reception station should be developed without vagabond ELF/VLF fields. It should be equipped with a grounded, vertical antenna as well as two horizontal antennas, with shielded cables running to the circuitry. The latter should also be EMC-shielded. Preferably, this circuitry would be powered by battery-buffered solar cells **[51]**. Sferics fields could thus be analyzed in real time in pristine nature, undisturbed by technics. This would be at a location remote from the sferics measurement station itself.
- Inquiries were sent to manufacturers of electrotechnical therapeutic devices. Basic information was obtained on how to design portable, miniaturized sferics near-field radiation elements **[51]**.
- Future studies should compare the influence of 50-Hz and 60-Hz fields, used in U.S. and EU power grids. The biologically repressive intensity of the effects should be determined. This is related to A/B comparisons in epidemiological studies and projects for developing household appliances powered entirely by DC current, etc.

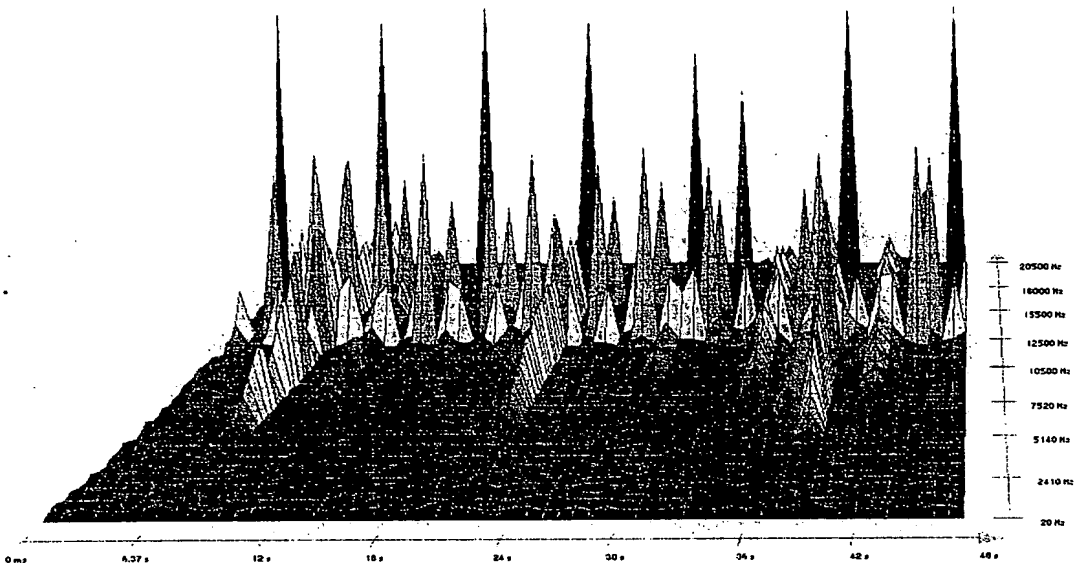


Figure 13.1: Three-dimensional spectrogram analysis of sferics activities on 8/15/2002 at 9.30 a.m. on the Swedish island Oeland.
The meteorological situation was as follows: nice weather, cirrus cloud cover, 20 degrees. In the distance, severe flooding (an environmental catastrophe) was caused in Central and Eastern Europe by the extreme precipitation of a low-pressure cyclone. On Oeland, the weather situation was nice and stable. However, there was cirrus cloud cover and people were strangely irritable. Note there were conspicuous Omega signals at 12/12.5/15kHz, which are unusual during nice weather.

- Assume for the moment that aggressive weather situations or even earthquakes can be predicted, based on sferics/technics abnormalities. If this is true, then the following is also plausible. In those areas of Central America with a relatively great risk of **tornados**, it should be possible to predict these highly destructive natural forces, based on the measurement principles presented here. Appropriate

measurements or recordings should therefore be made at suitable locations.
This presumption is supported by weather catastrophes in Central Europe during the second week of August, 2002. The storms caused the river Elbe in East Germany to overflow. Dams collapsed, flooding major metropolitan areas such as Dresden. By coincidence, sferics were recorded from August 9 to 15, 2002, in southern Sweden and later analyzed. These sferics recordings showed unexpectedly strong 15-kHz Omega signal components as well as a large number of lower-intensity 12-kHz/12.5-kHz Omega signal components. This was indicated, even though the long-term local weather was good, over a large area, with slight cirrus cloud cover (in accordance with **Figure 13.1**). Retroactively, this points to the presence of an extremely pronounced low-pressure system (cyclonal weather). As described above, during especially nice weather usually broadband sferics bursts are conspicuous. Such weather normally does not have these technics at the frequencies 12 to 15 kHz, which were virtually the only visible signals. For several days, it was observed that the people in this area were unusually aggressive. At the time this was perplexing; the analysis then provided the explanation.

- Further data should be acquired and stored in an easily reproduced form, not only with regard to earthquakes and related sferics abnormalities. In addition, volcanic outbursts should be investigated retroactively; these events should be correlated with the discussed sferics analyses. Such data collections would make it possible to predict volcanic outbursts.
- Pilot experiments should be performed to optimize magnetic field therapy. They should be based on signals which vary over time and in terms of pulse spectrum. This work should be substantiated by double-blind experiments. In addition, it might be meaningful to administer the Prognos® test; cf. Appendix.

- In all enclosed industrial areas and rooms, the room climate could be improved by means of (time-) synchronized weather sferics introduced from the outside. When the weather is bad, the climate could be enhanced by additively mixing in nice-weather sferics signal components. Exposure to sferics could be automated by providing permanent sferics measurement data for all inhabited areas. This data would trip a sferics On/Off signal as needed.
- At present, major issues on how to administer sferics are unresolved and require additional study. Answers must be found to many questions, such as the following:
  - How long should sferics be administered?
  - Which minimum exposure to sferics is meaningful?
  - What are the maximum permissible technics levels?
- Various sferics applications located in the near field of humans, animals and plants and the related weather situations should be further investigated. The following cannot be entirely ruled out: When the level of the technics field increases and nice-weather sferics are administered as a countermeasure, then starting at some field level the overall effect could be negative. It is a reasonable assumption that this intensity level varies from individual to individual. This could possibly enhance "healthy" cell growth **[7, 56]**, leading to rapid, cancerous proliferation. The so-called RIFE frequencies **[57]** are of special interest in this regard. They are presumably related with the "happiness frequency drug" **[22]** described above, the frequency of the technics as well as with AIS broadband bursts. The RIFE frequencies most likely affect the fundamentals of bioresonance therapy in general. Hence, knowledge of the sferics/technics spectra gained in this work should be compared with the RIFE frequencies.

- The knowledge presented here should be taken into account and further modeled, in addition to the known models of electromagnetic phenomena in the earth's atmosphere using mathematical and system-theoretical functions and equations **[37, 42, 58]**. The weather forecast and biotropical forecast should include the distance (place of origin) of atmospheric discharge areas, as calculated by means of the temporal signal and spectral structure. **Figures 13.2** and **13.3** show signal curves ranging from broadband near-field Dirac pulses to narrower-band far-field sferics bursts; the signal shape is clearly a function of the distance. An advantage is that sferics discharges can be localized by just one measurement station; otherwise, multiple measurement stations are required **[53]**.

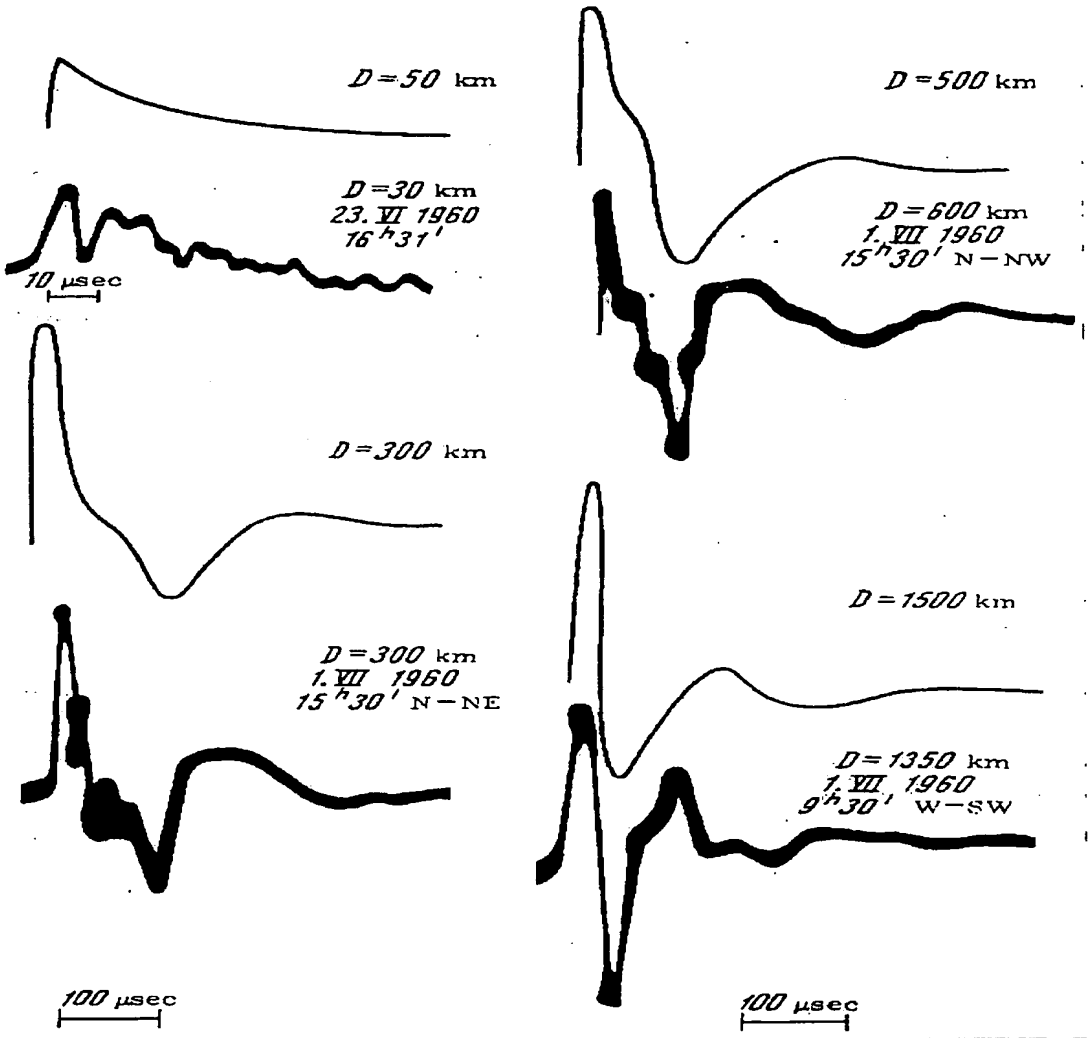


Figure 13.2: Overview graphic of sferics signals recorded in nature (from **[58]**, p. 93) and comparative display of the attenuation effect as a function of the distance D.
This conforms with a Dirac impulse in the near field or thunderstorm situation and with a Gaussian burst in the far field situation, from the viewpoint of signal theory and electrophysics.

- The data material for meteorologists can certainly be improved by including biotropical forecasts (predictions of the meteorosensitivity or weather constitution of humans), based on direct sferics/technics signal analysis, with 3-D spectrum analysis per time unit as presented here, and linked with statistical contexts. This could be done by combining Baumer's statistical analysis of sferics **[3, 41]**, as shown in **Figure 13.4**, with:
  - the investigative signal level-based technique presented here for optimized, local short-term prediction of weather and storms; as well as with
  - the creation of a medical-biotropical early-warning system for people who are meteorosensitive, epileptics, etc **[30]**.

The above-mentioned sferics field recording equipment could be switched on and off automatically, controlled by the weather **[51]**.

- Multiple sferics measurement stations should be used to forecast earthquakes and precisely calculate their epicenters (before the earthquakes occur). These measurement stations should be distributed over the entire globe. This should be done with at least two of X selected measurement stations. (Here, X is e.g. the quantity 12.) The measurements should be made in autumn, winter and spring, preferably during poor, wet weather. The sought-for ULF abnormalities in the 3-D spectrograms can be easily received and detected in such circumstances.

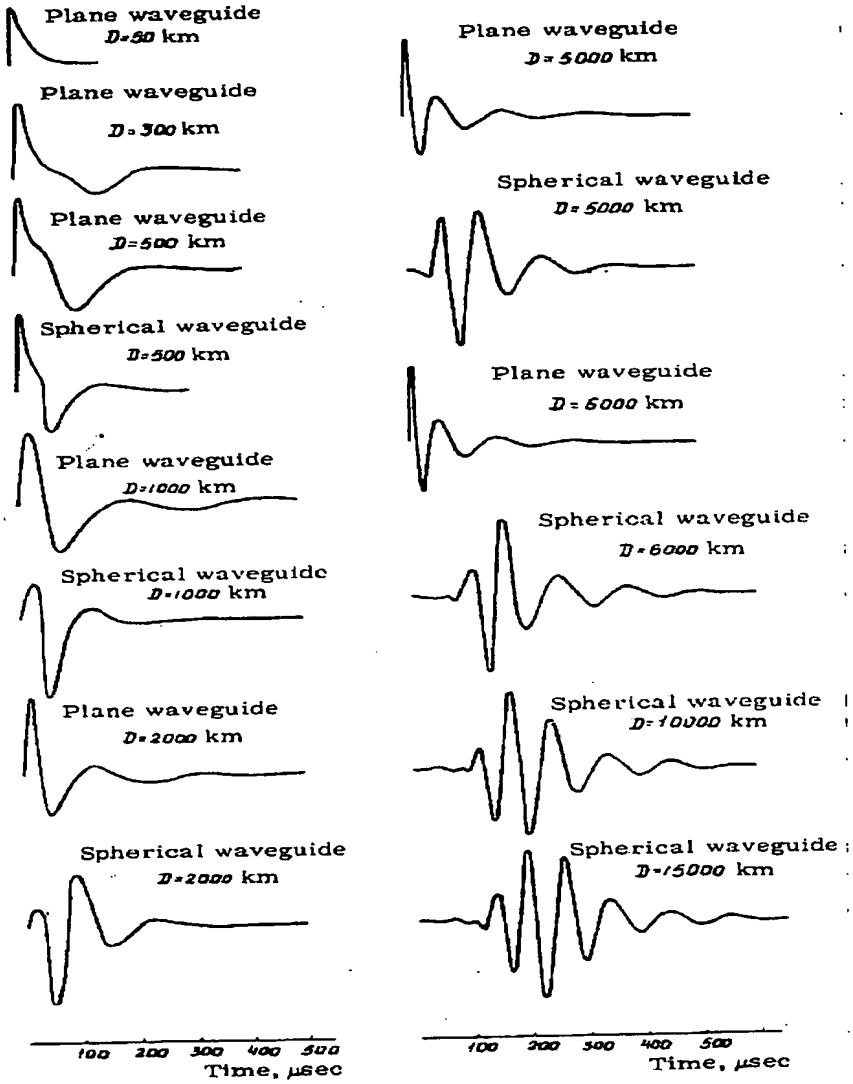


Figure 13.3: Overview graphic of sferics as well as burst waves calculated from models (from **[58]**, p. 92).
This is a comparative display of the atmospheric attenuation effect, as a function of the distance D. The essential aspect is that these discharge time curves in the near-field situation actually conform with a Dirac impulse during nice weather or thunderstorms (distance D = 50 km, equivalent to a broadband burst); in the far-field situation, these time curves conform with a Gaussian burst over a limited frequency range for wide-spread areas (e.g. low-pressure systems); cf. **Figure 13.2**.

- One of the following must be developed, in order to optimize detection and extraction of very low- to higher-frequency abnormalities in the sferics spectral time curves **[46, 47, 48, 49]**:
  - templates, which can be set flexibly. With these templates, the supervisor of the measurement station samples the 3-D graphics visually; or
  - time-analysis software for the time-based spectrogram analysis. This software would work like a supervisor. This time analysis would verify automatic detection of the abnormalities **[59]**.

The above discussion outlines studies and suggested applications which have not yet been implemented. These are merely a few of the possibilities which will open up as sferics/technics analysis improves. **Figure 13.5**, a recent AIS spectrum analysis, provides final documentary proof of some of these future possibilities.

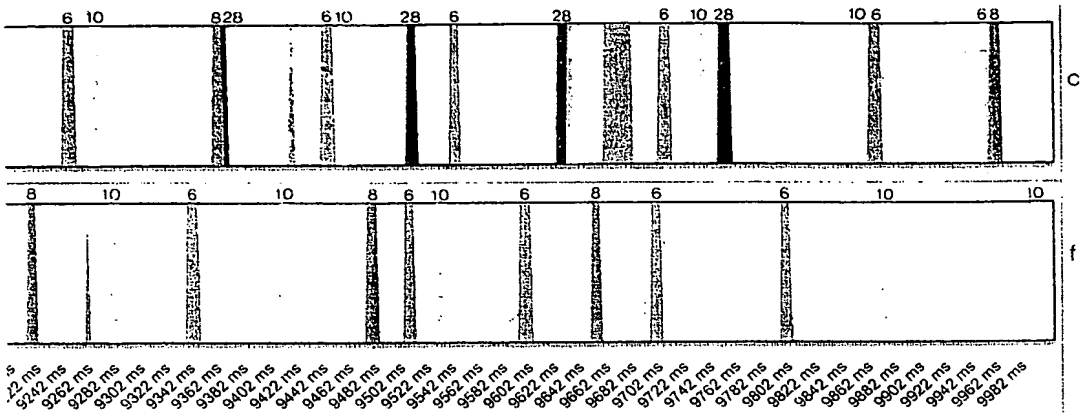


Figure 13.4: Temporal portion of a long-term sferics recording made in the environs of Munich, from 9/1/1998 – 9/1/1999 (from **[41]**). Note in particular the stochastically distributed occurrence of atmospheric discharges.
Also, the intensity of the sferics signals is shown as a thick or thin bar. The numbers above the colored bars indicate the main intensity frequencies of the sferics signals at 6/8/10/28 kHz.

Finally, a practical example will be given from the processing of natural products. This example demonstrates that sferics influence natural processes, in ways that are unknown to science. It was observed that thunderstorms made it virtually impossible to improve the durability of fresh-cut logs **[60]**. Until the 1980s, fresh-cut pine logs were pumped full of the timber preservative Xylamon using high pressure. During normal (nice) weather, this succeeded; at the treetops, the timber preservative oozed out. Logs cut before or during thunderstorms do not absorb any Xylamon; this is known in the wood-processing industry. Apparently, (pine) trees recognize broadband (thunderstorm) sferics signals of the atmosphere. These signals cause the trees to become high-ohmic objects. Then, thunderbolts can hardly discharge (current flow) via these high-ohmic, "antenna-like elements". These practical observations agree with descriptions of the causes of "forest death" and of

the subsequent electrolysis or hyperacidity of the ground **[20]**. Conifers, for instance, act like reception antennas for high-frequency fields.

The list of interactions between organisms and electromagnetic information provided by nature (in the ELF/VLF range, among others) could be continued indefinitely. A mere example is the way insects and ants change their location, depending on the imminent weather situation **[1]**.

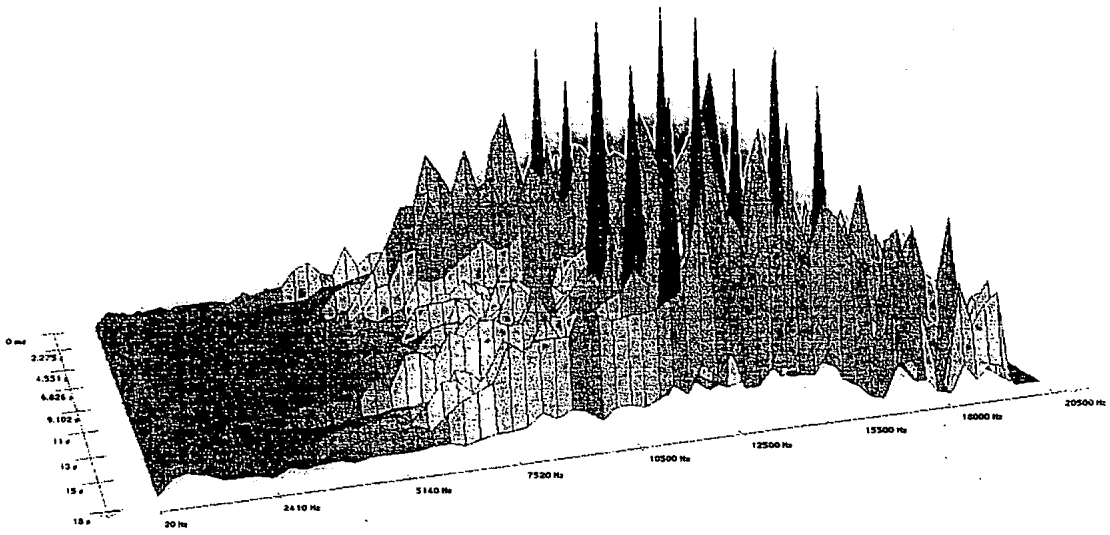
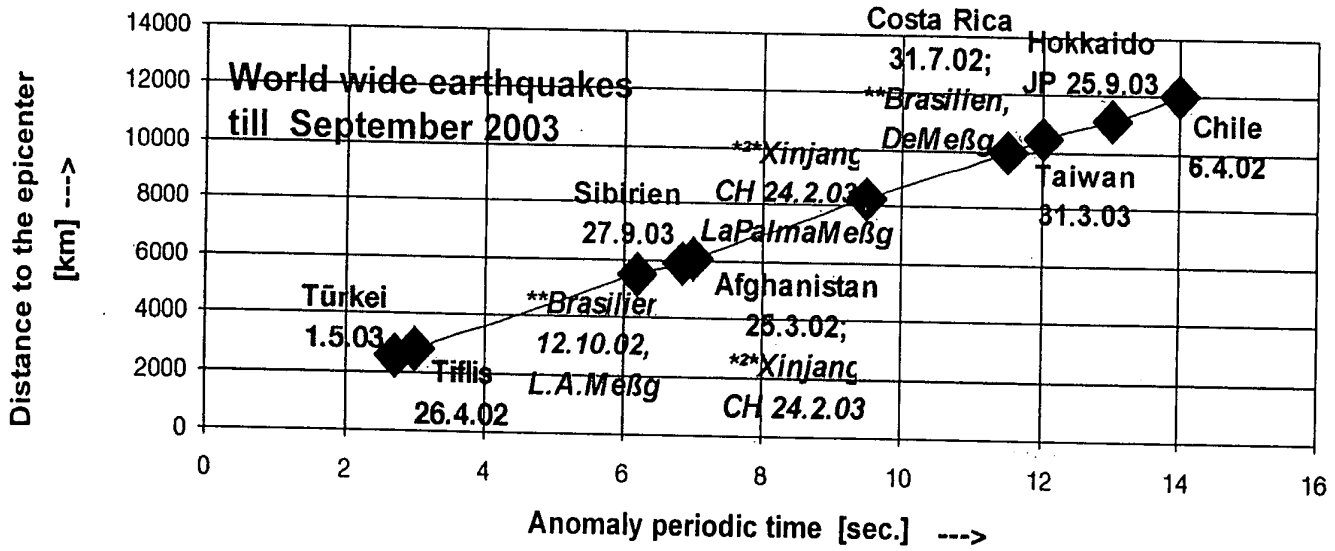


Figure 13.5: Three-dimensional spectrogram analysis of sferics activities on 9/12/2002 at 9.30 p.m. in Alling, Germany.
The meteorological situation was as follows: Both beforehand and afterwards two days of stabile, nice weather at the margin of a high-pressure area; 14 degrees. The way people felt could be described as neutral. Accordingly, broadband AIS occur at 12 und 15 kHz with Omega signal components having relatively intensive levels. Correspondingly, these broadband AIS are visible with Omega signal components (at frequencies of 12 and 15 kHz), which are conspicuous in terms of their spectral levels. They are visible with Omega signal components which are also conspicuous in terms of their time-statistical existence. This is a sign of low-pressure systems at a distance of some thousand km, north of Scotland and in the Mediterranean Sea to the south.

Correlation between "earthquakes and periodic anomalies in 3D spectrograms"; [2*] *beard earthquakes*

(intensity of earthquakes between 6 to 8 acc. to the RICHTER scale)



It was found a **function to pre-calculate epicenter areas** (hint: distance from the measuring place) regarding to the aspectable earthquakes: **distance = 0,857 * (anomaly periodic time)**. Till 2003 were registered 8 huge earthquakes / epicenter (intensity > 6 acc. RICHTER scale) and 2 recognized „before"! **Conditions for pre-localization's:** More than two worldwide distanced measuring stations distance > 5000 KM / 3000 Miles. The technics / sferics should be rec. during bad or unstable weather (herewith the Omega signals are spectrum dominant).

APPENDIX

Update of earthquake forecasting by means of sferics analyses – as of Februar, 2003

Due to fortunate circumstances, it was possible to be in Los Angeles, California, at the beginning of October, 2002. On 10/9/2002, sferics/technics recordings were made in Los Angeles directly at the Pacific Ocean at around 8:00 a.m. It was determined retroactively that a violent earthquake had occurred on 10/12/2002 in West Brazil (in the town of: Cruzeiro do Sul), which registered 6.8 on the Richter scale. A 3-D analysis was made and displayed in graphical form. In the graphics, an abnormality period of six seconds could be detected (the analysis was performed in accordance with **Chapter 9.5**: the maximum values were viewed from signal peak to signal peak). These abnormalities took place during the periodical Omega signal sequences (peak-to-peak maximum values).

The distance between the measurement site in Los Angeles and the epicenter is 5,600 km. At 10/13/2002 at 7 p.m. (a few hours after the earthquake) sferics measurements were made near Munich (Germany). Here, too, an abnormality with a period of 10 to 11 seconds could be detected. It was conspicuous, but weaker. This abnormality is related to the calculated distance to the epicenter, around 10,300 km.

An earthquake was localized precisely for the first time on *2*10/9/2002 and on 10/12/2002. Intercontinental measurements of the sferics before the earthquake in western Brazil could be made in both *2*Los Angeles and in Bavaria within a time span of a few days. The calculated distances were drawn by hand on a map of the world, by drawing two circles with a compass. Each was centered at one of the measurement sites. These distances resulted in a suitable intersection (based on two circles). The intersection corresponded with the epicenter in Brazil on 10/12/2002.

It is not appropriate at this point to discuss further earthquakes which were forecast on the basis of the above-mentioned measurements and analyses. A sufficient number of earthquakes were picked up and analyzed, in order to substantiate the findings of this work. Based on the Omega signal ULF periodicity, the phenomena were found to be repetitive (cf. **Chapter 9.5.**).

However, recent volcanic outbreaks at Mount Etna between 10/31/2002 and 12/1/2002 are noteworthy. Sferics/technics measurements were performed in Bavaria on 10/30/2002, before these events. The measurements resulted in an abnormality time T of 2.3 seconds.

The distance D between the measurement site and the outbreaks was calculated retroactively. However, this calculation did not precisely verify the function $D = 0.86*T$ developed and discussed in **Chapter 9.5.2** above.

Within the framework of this brief discussion, it is not possible to deal with the issue of whether geophysical-electrical divergencies exist here between the models for of earthquakes and volcanic outbreaks.

However, this Etna event appears to confirm the tendency of the manually drawn model graphic with a linear origin outside the origin of coordinates. A function $D = 0.86*T + t$ seems to be more realistic. This case also confirms that the value specifications of the discussed function $D = 0.86*T$ cannot be considered to be substantiated. Furthermore, not all earthquakes can be detected by means of such abnormalities; for instance, because so many earthquakes occur every day (cf. **[46]**).

Finally, the following relationship must be emphasized. The clearest predictive correlations (including the ULF anomalies from the 3-D spectrum analysis graphics) were possible when the weather was rainy and variable; and primarily in spring, autumn and winter.

The periodical level drop-out pattern of the magnetic field recordings of Omega signal sequences were the major issue. That means that not the sferics but rather technics are helpful in the frequency range of 12/12.5 kHz, 15 kHz and others. The reason for this is as follows. The Omega stations are stationary transmitters of VLF alternating fields. Around the globe, the pre-earthquake field events superimpose themselves on or modulate the Omega signal pattern on these alternating fields. That produces the periodical waviness (anomalies). Sferics, on the other hand, arise stochastically at a wide range of different locations at time-variant moments. Hence, comparisons or correlations cannot be based on these innumerable arbitrary phenomena.

The simplicity of these measurement, recording and analysis techniques thus gave and gives the capability of forecasting earthquakes, in addition to forecasting the weather and recording the nice-weather sferics. The analysis results correspond

with the knowledge as stated in **[46]**, from the point of view of system theory. This lead to the European patent application EP 03009197.7.

Sferics properties and the four seasons: Is the transition from increased dominant Omega signal components/technics to broadband bursts/sferics due to the transmission characteristics of humidity and water?

As mentioned in the main context, the sferics spectral analysis patterns appear to reveal more and stronger broadband bursts as summer approaches. In contrast, the Omega signals become weaker, or cannot be detected or are hidden. The cause is most likely tiny droplets of water (clouds) in the atmosphere. They exhibit passband transmission characteristics which are a function of temperature **[61]**.
Many analyses of sferics and technics have now been made; they verify the cause of water droplet influence theory statistically. So on the one hand, this theory has been confirmed. On the other hand, data has been acquired which contradicts the water droplet influence theory. As a fundamental principle, in winter the technics in the 3-D spectrograms would theoretically have to be more dominant than the sferics. During the night of 9/24/2002, snow fell surprisingly early, for several hours, with snow cover of 2 - 5 cm; the temperature was minus 1 to 2 degrees in all of Bavaria. When compared with sferics activities, no dominant Omega signal sequences could be acquired or shown. Almost only broadband bursts could be acquired (cf. **Fig. II.**). Within about one week afterwards, a stabile high-pressure system had spread throughout Central Europe. This happened again on 12/9/2002; the following

discussion will deal with the repetition. During afternoon foehn nearly a month later (on 10/23/2002), the situation was quite different. At the frequencies 12, 12.5 and 15 kHz, typical highly-dominant Omega signal sequences were detected. These technics alternating signals are typical for a foehn weather situation, with the biotropical effect that people were ill tempered had nearly identical intensities. (Note that in low-pressure areas, mostly 15-kHz peaks are shown in 3-D spectrograms.)

High-resolution sferics analyses without any technics signal components; filtering out biotropically effective Omega signal sequences

Until now, the essential AIS structure analyses described above were made including the Omega signal components. In order to obtain finer details in a high-resolution display of the pulse walls, all technics should be removed from the 3-D spectrograms. This suggestion is made because of the frequency-dependent varying broadband discharge peaks (in accordance with **[3, 57]:** sferics frequencies 4, 6, 8, 10, 12, 28 kHz) in the discrete burst walls of the sferics activities. They appear to contain the statistically relevant, biotropical information. However, for future medical applications, they should be available without the technics. That means that, depending on the weather situation, certain burst frequency ranges are more intensively generated and transmitted in the atmospheric air layers around the globe. The exception is whistlers and tweeks **[36, 37]**, which demonstrate the mentioned effects exterior to the earth's atmosphere.

In order to be suitable for future therapeutic applications, sferics recordings must possess the original biological characteristics of a pure nice-weather alternating field. This means the technics (e.g. Omega signal components) must be filtered out entirely. It might be necessary to reconstruct the pulse wall structure. Hence, experiments exposing animals (such as horses) or plants to sferics alternating fields should complete this data. Such exposure to electromagnetic fields can be implemented using existing devices. This can be based on the specifications made in European patent application in EP 03007025.4.

A model can be derived by inversion. It will be described now.

For many millennia, **meteorosensitivity** has correlated with the sferics. For wireless transmission of information, artificial alternating fields have been introduced and propagated additively. This has possibly intensified **meteorosensitivity**. At 12/12.5 kHz and 15 kHz, there are technics frequency ranges which have a tiring, aggressive and depressive effect on humans; cf. Omega signal sequences. This can be explained on the basis of the signal intensity in the weather-related spectral areas with increased intensity. This phenomenon is due to the atmospheric resonant cavity effect.

Thus, in these spectral ranges the levels of sferics and technics (which are periodical permanent alternating field signals) are added, compared with the natural, stochastic sferics encountered in the past **[3, 29]**. In terms of the time view, today the alternating signal presence increases tremendously. The result is that the biotropical effect of the signal mixture is most likely greater. Laboratory experiments and epidemiological studies would be required to substantiate this hypothesis.

On the possible synchronization of plant growth with the yearly rhythm of the sferics

During research taking many years **[62]**, the periodical and mechanical growth movements of plants were recorded visually. This was based on climatic and lighting conditions which could be set as desired in the experiments. It should be emphasized that the studied plants apparently displayed a seasonal growth cycle, although they were not exposed to a natural climate or light source. That could be

related to insufficient, nonshielded or nonvisual information – presumably long-wave magnetic fields in the form of sferics activities.

Therefore, the AIS might have a yearly rhythm for the frequencies 10 and 28 kHz, in addition to their daily rhythms, as shown in **Figures 9.2.6** and **9.2.7**. The topic of yearly rhythms of the AIS should be investigated.

The above thesis is verified by the fact discussed above or in **Chapters 4 to 6**, and which is repeated here as a causal interrelationship: From winter, through spring and into summer, the overall sferics level increases; starting in the fall, it decreases accordingly around 20 dB. In parallel, there are spectral changes in the burst discharge curves. For this reason, plants are currently being exposed to artificially reproduced nice-weather sferics. This involves plants which normally start growing in the spring.

In December, 2002, the author of this work was able to put forth a tropical dragon tree in Bavaria. It is plausible that plants only begin to grow when a certain, natural electromagnetic burst intensity (or spectrum) has been reached. This notion should be studied carefully, under precisely defined experimental conditions.

More current data on the test persons of the pilot blind experiments

The above-mentioned pilot blind study (cf. **Chapter 10**) with reproduced technics and sferics was continued. The following additional test persons participated, with the following results:

26.) Beel.: Track 10 tiring compared with 3 and 3 was perceived as more pleasant; 3 compared to 9 softer/more neutral; track 5 compared with 3 oppressive/feeling of

vibration; track 9 compared to 7 heavy, leaden/tiring/feeling of vibration <> track 7 simply more pleasant; 2 compared to 12 slight pressure in head (50 Hz included in sferics).

During anamnesis, the test person stated he/she is not meteorosensitive, no amalgam in his/her teeth and grew up in a rural area; uses a mobile phone, works at a PC (10/16/2002).

27.) Dör.: Track 9 compared to 3 "very good " (compare with relative good); track 5 compared with 3 agitating; track 7 compared with 5 eyes relaxed; track 9 compared with 7 "stress my back"/pressure on eyes and especially for 7 "eyes loosen up/freer". Anamnesis: slept poorly, uses a mobile phone (10/16/2002).

In summary, both test persons seems to perceive track 3 as the most pleasant reproduction of an alternating field, further substantiating the significance of the previous 29 test persons.

Analogies to the dominance of the sferics levels during high-pressure weather situations for all seasons

The biotropical weather situations were compared with one another, including the related sferics (cf. **Chapters 9 – 12**). The following point was clearly shown. During **nice weather in the summer** (in particular **when stabile high-pressure weather begins**) the levels of natural, electromagnetic alternating field components dominated, compared with the technics. In contrast, in the late winter and spring of 2002, no meteorological situations were encountered with few technics in the 3-D spectrum analysis graphics.

This leads to the hypothesis that in winter the sferics levels would be less conspicuous compared with summer, for atmospheric and wave-theoretical reasons (related to the low temperature).

Two major examples proved this to be wrong. For one thing, in the night of 9/24/2002 sferics activities were recorded which showed only AIS in the 3-D spectrograms (cf. **Appendix, Chapter II:** snow cover, temperature under zero degrees Celsius). Thereafter, a stabile high-pressure area formed, lasting several days. As a matter of principle, that would agree with the searched nice-weather sferics signals.

A similar weather situation was measured in the morning of 12/9/2002. In addition to the overall winter situation (no snow, temperature of around 5 degrees Celsius during the day), there was a stabile, young high-pressure system. Only sferics broadband discharges could be seen on the 3-D analysis graphics.

On the other hand, on 1/8/2003 sferics activities were studied during a high-pressure weather situation which was presumed to be similar. (This proved to be

false; cf. intermediate high-pressure area). The weather was as follows: closed snow cover, clear sunshine, minus 8 degrees Celsius. At 10 a.m., in Iffeldorf (Bavaria, Germany) a highly dominant Omega signal presence could be recorded. Around 30 hours later, this confirmed the event of snowfall, which lasted some hours.

In the same context, bioclimatologists and biophysicists have presumed that snow cover extending thousands of square kilometers would attenuate ELF/VLF alternating fields (mostly related to technics). It is considered that snow is to be seen as an absorbent material, similar to quartz sand in its crystal state.

These considerations are based on the following:

When there are no gaps in the snow cover at a temperature of e.g. minus 3 degrees Celsius in winter, then several electrosensitive people feel better and more relaxed (they can breathe more easily) compared to the same temperature without the snow cover. This lead to the notion that that the above-mentioned ELF/VLF alternating field attenuation could play a major role in the feeling of relaxation which these special people have. However, the author's own individual measurements did not detect any significant difference, when comparing the field situations with and without snow cover at the same temperature. The cause is presumably to be found outside the ELF/VLF alternating field frequency range.

In summary, this is also amazing, especially since as winter progressed the overall temperature level had dropped. Apparently, the overall level of recorded sferics and technics decreased. Compared to the mean value in the summer or early autumn, the sferics/technics were measured as being around 20 dB less intensive.

For this reason, the electromagnetic signal mixture of sferics and technics (frequency ranges around 12/12.5/15 kHz) can be used as an indicator for meteorological forecasts during all seasons. This is in accordance with Chapters 9 – 12. It can be assumed that young, long-lasting (at least one week) high-pressure

systems in the process of formation are certainly the reason why the sferics dominate in the 3-D spectrum analysis modes. Thus, these high-pressure systems can be used especially well to acquire and store the desired ELF/VLF alternating signals.

PROGNOS™ test

Introduction

For space exploration, over a period of many years an interdisciplinary, simple test procedure was developed for medical tests. It is based on simple reactions of the skin's surface. The resistance of the skin t{R/kOhm} is measured at the meridian endpoints.

The data collected during development of this procedure was linked with medical diagnostics. The current form of the test shows how a person's organs react to specific influences (psychosomatics/autosuggestion). These reactions are essentially isolated from the person's psychological state. The procedure identifies those organs which are sufficiently supplied with energy and those which are not. The organs are either healthy or blocked, with stasis or blockages.

The PROGNOS™ test **[63]** is internationally recognized. It enables the cause of diseases to be studied before their onset. In addition, it demonstrates the effectiveness or ineffectiveness of medicines.

Basic information on how the experiment was conducted

On 11/29/2002 in the offices of the company ULTRASONE AG **[64]**, test persons were exposed to artificial ELF/VLF fields by winding a piece of open-loop wire around them. The source was the headphone output of a JVC CD player.
This was done without providing shielding for low-frequency, vagabonding ELF/VLF alternating fields. The 50-Hz line voltage (20 V/m) caused **technics** signals; the measured level of GSM mobile radio signals, etc. was 100 $\mu V/cm^2$.
This is discussed in **Chapters 6** through **8.**
At a distance of a few centimeters to the wire, electrical alternating fields were measured. They were approximately as strong as the technics mentioned above.
That was the first time this small-scale experiment was performed. On that day, **four test persons** were coincidentally available. (This included the person named under **[61]**.) These persons were exposed to three artificial ELF/VLF field situations, each lasting two minutes.
For three test persons, the first and third field sequence (subexperiment) corresponded with a nice-weather field. The second field sequence corresponded with a technics signal (railroad plus harmonics).
One of the test persons was exposed to the above-mentioned nice-weather field from spring (cf. **Chapter 10.2**: track 3), to a special recording made in the Canary Islands (cf. **Chapter 10.2**: track 2) and to the above-mentioned technics (cf. **Chapter 10.2**: track 9), in a different sequence.
The experiments were designed as a **blind study**. This way, the test persons did not know which fields were being played. Before, between and after the fields were played, short pauses were made. During these pauses, the skin resistance at the

medians of the test persons' hands and feet was measured. In most cases, an initial measurement was made; two follow-up measurements were performed to check the initial results.
After each experiment, the test person was informed of the final measurement results (including a brief anamnesis).

Results of the short study

It could be demonstrated clearly that **all** test persons reacted to changing fields to which they were exposed. In addition, the body-related energetic condition of the nerve tracts differed clearly from the initial measurements.
The following was especially conspicuous. The stimulated regulation or regeneration after exposure to nice-weather sferics proved to be significantly **positive.** (The skin resistance dropped to "more healthy" values.) In most cases, the test persons were then exposed to technics; this was experiment 2. The physical/organic well-being deteriorated drastically. The test persons expressed this subjectively. Significantly, the PROGNOS™ test verified the deterioration.
The measured worsening ranged from 10 to 50% (minus), relative to the scope of regulation. Sferics, in contrast, produced a positive effect, from approx. 10 - 30%. Viewed statistically for all test persons, after exposure to sferics, in around 30% of the cases stressed organs changed from a pathological, underenergetized or blocked state to a balanced state. (This tendency is clear from the brief exposure times and few measurements.) For the other 70% of the test persons and their organic reactions, reports were obtained but were not statistically significant. Exposure to the technics, in contrast, caused a much more intensive reaction. Cases of

underenergized or blocked organs approximately doubled. In some cases, when sferics were replayed thereafter, they lessened, counterregulated or regenerated the apparent technics stress.

The amount of positive and negative regulation was compared as percentages. The PROGNOS™ graphics indicated this regulation by value ranges above and below the normal range dominated.

Summary

Based on the described test procedure and a related (blind) short study, the following could be determined with statistical significance.

When persons were artificially exposed to nice-weather sferics signals recommended and selected by the author, these signals had a positive, stimulating, regenerating and regulating effect. The opposite was true of the technics.

Thus, it could be shown that the test persons were biotropically electro-sensitive or meteorosensitive although the weather situations during the PROGNOS™ experiments was the same. This was possible despite the weather prevalent during the experiment (low barometric pressure, rain, 7 degrees on 11/29/02), and despite the effect of ELF/VLF fields.

Hence, an initial result is: It would appear that therapeutic application of sferics/ELF/VLF field exposure can be recommended. Such therapeutic exposure to synthetic sferics complements the real-time sferics/technics field events, such as the current weather situation.

The data needs to be substantiated thoroughly. A larger number of test persons should be used. In addition, more measurements should be made before, during and

after exposure to the ELF/VLF alternating fields. Future work should be performed as **double**-blind experiments. Such continuation of the work would greatly enhance the published results and knowledge **[64]**.

Creation of a CD with 20 nice-weather field alternating signals

Within a year, sferics were recorded at various locations around the globe. An initial version of these recordings was created, in order to select those nice-weather sferics which have the best biotropical effect. This version includes the following recordings, titles or tracks, listed in an abbreviated form:

Nice weather, 2/9/2002, Fürstenfeldbrück (FFB), Germany
High-pressure, 3/29/02, Lake of Constance, Germany
High-pressure, 9/12/02, FFB
High-pressure, 8/9/02, Gotland, Sweden
Clear, 8/22/02, FFB
Snowfall, 9/24/02, FFB
Nice,after thunderstorms, 8/22/02, FFB, relaxed
NiceClear, high-pressure,7/5/02, peaceful
High-pressure, 7/28/02, FFB
High-pressure, 7/28/02, FFB
Nice weather,start of high-pressure, 6/25/02, peaceful
Fog, nice weather, high-pressure, 12/9/02
Night, high-pressure, extracted tweeks
Sun, dry, 7/17/02,19, Washington, D.C. (U.S.A.)
Nice weather, clear, high-pressure, 7/5/02, peaceful
Clearing, after thunderstorm/storm, 6/21/02
Nice weather, clear, 6/17/02,10, Iffeldorf, relaxed
Nice weather, clear, 6/19/02, Iffeldorf
Nice weather, clear, high-pressure, 6/26/02, Iffeldorf, peaceful
Sferics as per **Chapter 10.2**, title 7

The current version of this work was finished in January, 2003. A further visit to La Palma in the Canary Islands is scheduled for February, 2003, in order to record suitable nice-weather fields and sferics. These recordings will be added to the CD.

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GLOSSARY

AIS → Atmospheric burst radiation (cf. concept itself) or burst discharge.

Alternating field → Field with nonuniform intensity per time segment; oscillating.

Atmospheric electricity → Atmospherics, atmospheric discharges → cf. AIS, CD sferics.

Bad weather → Meteorological situation which usually occurs during instable, cloudy, rainy low-pressure areas. Thunderstorms can form.

Band-limited (cf. narrow-band).

Biotropy → This is the capability of evoking physiological, biochemical reactions in an organism.

Broadband → A pattern of alternating signals or oscillations. These are single oscillations onto which a low to high number of oscillations are added or superimposed. In other words, these are summarized/mixed-together spectral signal/field pattern components which range from a lower limit frequency to an upper or higher frequency. The latter is usually several factors higher.

Burst → see pulse.

Burst discharge → Zones of charge which shift due to vertical/horizontal movements of the air masses. These air masses suddenly adjust themselves to the electrical potential equalization system or temporarily take the voltage/field value of zero.

CD sferics a.t.B. → Convective Discharge Sferics according to Baumer; cf. AIS.

Cirrus cloud → veil cloud; milky, veiled, not blue, clear skies; the sun's radiation is somewhat hidden or veiled.

Climate → Cf. weather or weather situation.

Cloud formation → Air masses, usually in high air layers, with high humidity of nearly 100%.

Cold front → When an air mass with lower temperatures is mixed or inflows under an air mass with higher temperatures.

Cumulus cloud → cotton pad-like cloud which hides the sun.

dB → Decibel; mathematically defined logarithmic comparison; here, referring to voltages.

Decay → The temporal area at the end of a burst/pulse, as well as its energy structure or intensity decrease.

Diffusion → Striving to expand, extend and penetrate. Characteristic, e.g., of molecules, usually through a biological membrane (comparable with the earth's gravity).

Dirac pulse → Needle-shaped pulse; cf. pulse

Dynamic range → The range of intensity variations of an alternating signal.

Earthquakes → Internal pressure-based tensions. They arise when land masses or areas of the earth's solid crust shift and, in particular, when they slide on one another. These motions cease sporadically, like a relaxation. The movements of land masses cause very slow shaking (ULF).

Electric field intensity, E. → A force on a stationary, positive charge per unit charge in an electrical field.

Electro smog, electro-mag. Term created to designate evident alternating fields assumed to be health hazards.

Electromagnetic → Concept for mixed fields, containing magnetic and electrical components. It applies starting with the ELF/VLF frequency range.

Electro-sensitivity → Characteristic of people who physically/psychologically react to alternating field emissions by feeling unwell. These are mostly synthetic, industrial electrical, magnetic, electromagnetic alternating-field emissions of any frequency.

Field → Quantity used in physics to describe the effect of a physical quantity in space.

Fitzroy storm glass → A glass, which is more or less air-tight. It contains a chemical substance which makes crystalline shapes visible, depending on the weather. Cf. weather forecast.

Foehn → Very warm dry wind, which often blows in the mountain valleys of Switzerland, Tyrol and southern Germany. It is caused when humid air rises against high mountains, causing heavy rains. The dried air reaches the valleys on the other side of the mountains and has many well-known biological effects.

Frequency range→ Cf. narrow-band.

Frequency ranges. Cf. Chapter 1; milli-Hz to GHz ; AF (audio frequency), ULF, VLF, ELF, HF, LW, SW, MW, VHF, UHF

Gaussian bursts → Brief signals with soft transient and decay behavior (cf. Omega signals) as well as primarily one frequency of oscillation. This is the opposite to a broadband burst, which consists of numerous signal frequency components.

Gibbs' phenomenon → Overshooting/decaying or temporally lengthening the curve of a pulse. This pulse curve originally was shaped like a needle, without a swinging shape. This occurs, e.g., with steep-edged filtering of digital audio signals at 20 kHz.

Gurgling/gurgling-like sferics sound → tweeks.

Harmonics, THD (total harmonic distortion) → Secondarily co-oscillating alternating signals above an intensity-dominant fundamental oscillation.

Hertz, Hz → Unit of frequency; the number of oscillations per second for an alternating signal.

High frequency → Number of alternating field oscillations or frequencies starting at some 10,000 Hz and increasing.

Horizontal → Direction parallel to the earth's surface.

Ionosphere → Areas far removed from the earth's surface which possess certain, electrical conductivity (ions/electrons, radiation protection layer). They start at a distance of some hundred kilometers. Further layers (atmosphere, troposphere, stratosphere) are below or within the ionosphere.

KM → Abbreviation for kilometer (specification of distance).

Level → Intensity of a field in a logarithmic relationship or ratio (relation).

Lightning bolts → Discharges of atmospheric electricity (atmospheric discharges, visible lightning). They are formed only when air masses move vigorously, or during thermals. Cf. invisible lightning bolts = sferics.

Limit value → Maximum value , etc., for field quantities; established by a commission consisting of specialists.

Low-frequency → Number of alternating field oscillations or frequencies starting at some 10,000 Hz and decreasing.

Magnetic field therapy devices. Devices which generate alternating fields. They are based on knowledge gained from experiments which exposed, e.g., humans to magnetic field radiation at certain frequencies.

Magnetic flux → Its density is measured in Telsa (1 Telsa =104 gauss).

Magnetic flux density → Force that an electromagnetic source exerts on charged particles.

Meteorosensitivity → Unpleasant physical-psychological unwellness. Varies, depending on the weather situation, but occurs repeatedly.

Meteorotropy → This is the reaction of biological, biochemical systems to weather influences. This was later of primary interest, as the subjective sensations and feelings of test persons.

Microwaves → Electromagnetic waves at, for instance, the frequencies 915, 2.450, 5.800, and 24.225 MHz.

MU metal → Special heavy-metal alloy for optimal shielding or dissipating of low-frequency magnetic fields.

Narrow-band or band-limited → Transfer of information by means of alternating signals. These signals occur in a narrow range of number of oscillations or frequency. See also frequency range, which is not necessarily narrow.

Nice weather → Meteorological situation usually occurring during a sunny high-pressure area.

OMEGA navigation transmitter signals → Horizontal electromagnetic sine/sinusoidal signal components with frequencies between 10 and 15 kHz (technics).

Oscillating magnetic field → Fields generated with electromagnets of alternating current. The intensity varies periodically according to the frequency and type of wave in the magnet.

Parameter → Physical magnitude, which characterizes meteorological conditions (see humidity, temperature).

Period/periodical → Event or variation of an intensity quantity which repeats within equal time segments.

Pulling effect → Relatively weak, usually high-frequency electromagnetic field components (e.g. lightning bolts) are added to a relatively strong permanent field component, in a "piggy-back" manner (cf. radio stations).

Pulse radiation. Electrically, magnetically, electromagnetically determined field change without periodical time curve.

Pulse, burst, spike, Dirac pulse → Electrotechnically brief switching on of a current pulse with a relatively long time without current flow.

Resonance, resonance effect, resonance frequency, resonant → Electromagnetic wave patterns formed due to superposition of oncoming and reflected waves, leading to very high rates of heating. Resonance can occur inside a food for specific combinations of size, shape, and food property.

Schumann resonance → A permanent magnetic field starting at frequencies of around 7.8 Hz. It propagates resonantly between the surface of the earth and the ionosphere. It is excited by global lightning.

Sferics/pulse radiation (cf. AIS).

Sinusoidal Wave → A mode of propagation of magnetic fields.

Smog → Combination of the words "smoke" and "fog".

Spectral analysis/spectrum analysis. Given or visible components of an alternating field with various numbers of oscillations, shown as a function of frequency.

Spike → Cf. (needle) pulse.

Static magnetic field → Magnetic fields with a constant strength over time.

Steep-edged → Limit of a filter section or high-/low-pass filter which transitions from the passband to out-of-passband within a few Hertz of the signal frequency, or greatly attenuates or reduces the signal. For instance, 6 dB/octave is common filter behavior; however, high-performance filters with greater than 24 dB/octave are considered to be steep-edged (application for narrow-band filtering).

Stochastic. Signal and system detection quantities with process-change behavior which cannot be predicted (is nonperiodical).

Stress (aggressive). The sum of environmental stimuli of physical, chemical and psychological character, which creates physiological strain (overexertion) of the bodily functions.

Telsa (Nikola Tesla) → Unit for expressing magnetic flux density (B). 1 Telsa (T) = 104 gauss.

THD → See total harmonic distortion.

Thermal → Air masses which rise due to the influence of heat; or air masses with different temperatures. - turbulence – air masses.

Thunderstorms → Powerful rain showers visible, stochastically occurring discharges between air masses (cf. Lightning bolts).

Total harmonic distortion → Harmonics.

Turbulence → Air masses which mix due to different winds and temperatures. They result in winds or rising/sinking air masses (cf. thunderstorms).

Tweeks → Brief, tonal sferics sound, for which the lower-frequency component (mostly above 1 kHz) is delayed. Comparable with a brief whistling sound which begins high-pitched and stops lower-pitched after some 10 milliseconds.

Unstable situation → Meteorological, increased temperature change > 0.6 degrees per 100 meters; cf. weather change or deterioration.

Variable frequency → Sweeping over a range of frequencies during the microwave heating process to improve uniformity.

Vertical → Direction perpendicular to the earth's surface (rising perpendicularly, etc.).

Warm front → When a warm air mass with higher temperatures slides over or flows into an air mass with a lower temperature.

Weather → The day-to-day changing meteorological functions.

Weather forecast → Statements on the future weather or temperature, sun, rain, precipitation conditions, based on visible means (such as satellite images) and technical measurement parameters (air pressure, humidity, temperature).

Weather situation → Conditions on the earth's surface, resulting from atmospheric and (in particular) meteorological factors, such as humidity, air pressure, temperature, rain or fog or sun as well as wind (climate).

Whistler → Tonal sferics sound, for which the lower-frequency component (mostly under 1 kHz) is delayed. Comparable with a brief whistling sound which begins high-pitched and stops lower-pitched after around one or two seconds.